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ABSTRACT

This publication suggests ways to use the treasure of places and things existing in the national parks, in schools, and in communities for effective programs in environmental education. The report begins with a discussion of the use of the school facility and site as a learning laboratory with pictures and text to illustrate how various schools put school sites to good use. Next, the report describes the use of community facilities for environmental education; examples of urban, suburban, and rural areas are provided. Regional centers are then discussed and both existing nonresident and resident centers and their programs are described. The document concludes with some suggestions for planning resident centers and some examples of partnership arrangements between school boards and various agencies to finance resident programs in environmental education. (Author/MLF)

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Environmental Education / Facility Resources

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A Report from
Educational Facilities Laboratories

Developed in Cooperation with the
National Education Association
and
National Park Service
U.S. Department of the Interior



ENVIRONMAN is the symbol associated with the National Park Service environmental education programs.

It represents man's growing awareness of his total involvement in the environment, his responsiveness to and responsibility for the world around him.

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"We must meet at least two minimal needs—the need for environmental education of a scope never before undertaken, and the need for a man-centered environmental ethic."

GEORGE B. HARTZOG, JR., DIRECTOR
NATIONAL PARK SERVICE

"It is incumbent on every individual of every age to improve the quality of the environment in which man lives. Education's role is critical. We must provide the leadership in developing an aware and enlightened citizenry equipped with a basic understanding of environmental problems, the knowledge and skills to solve these problems and a basic motivation and desire to act upon them."

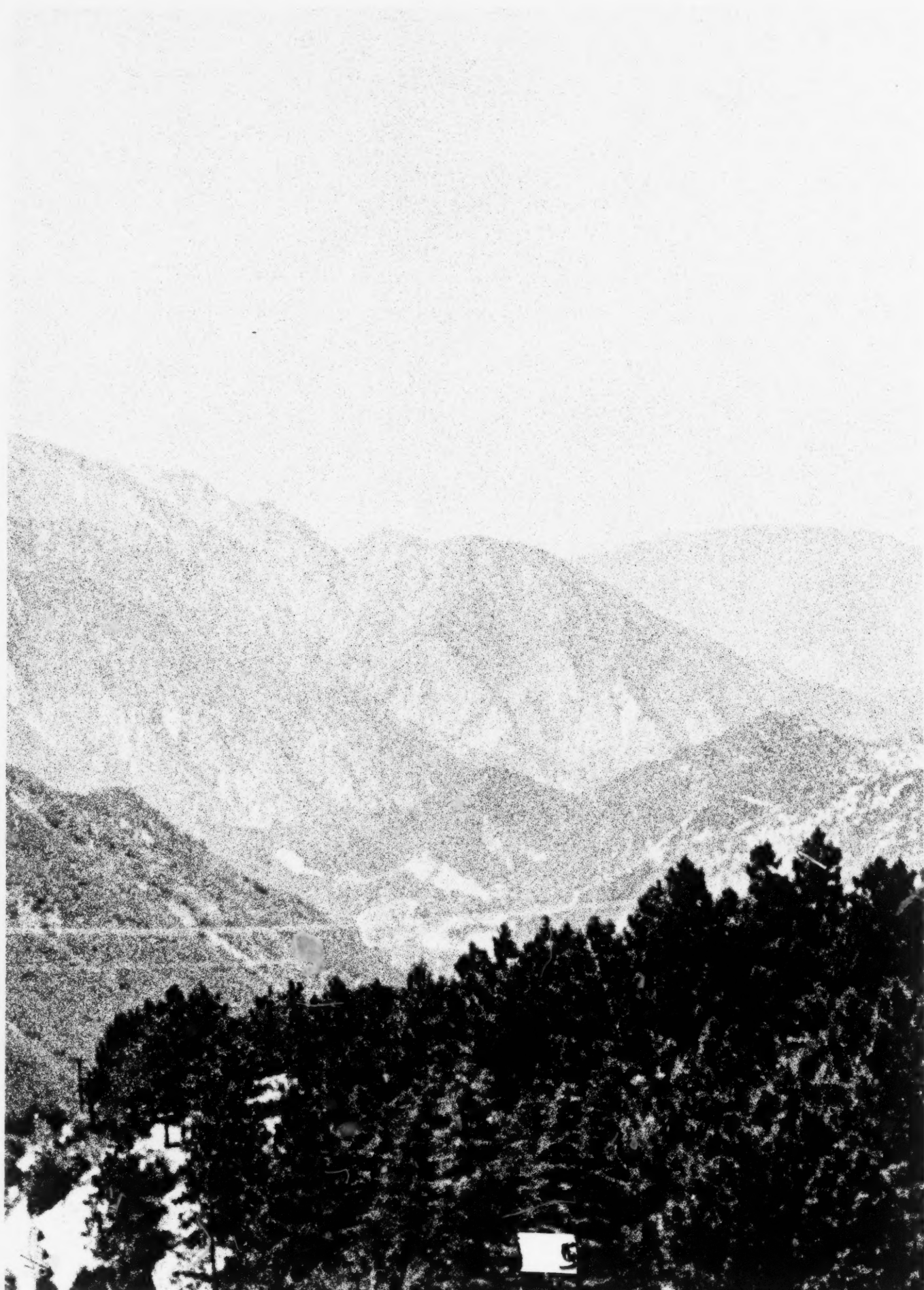
DON MORRISON, PRESIDENT 1971-72
NATIONAL EDUCATION ASSOCIATION

"Education must become the number one priority of the world. It is no longer enough to understand the past or even the present. Man must learn to anticipate direction and change, and teachers must help students acquire knowledge, ethical standards and life styles which recognize man's personal responsibility to quality environment."

JUST RODY, PRESIDENT 1971-72
ASSOCIATION OF CLASSROOM TEACHERS
NATIONAL EDUCATION ASSOCIATION

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Foreword



Encouraging educators and designers to develop good environments for education has been EFL's mission since 1958, so when schools began to teach about the environment at large, we had an immediate interest in finding out what sort of facilities were required. Early programs in environmental education uncovered many questions such as: Where would learning take place? Who owns the places? What should they contain? What do they cost to operate?

To help find answers, EFL joined with two organizations experienced in educational and natural resources, the National Education Association and the National Park Service. These two groups had contributed significantly to a national conference on facilities for environmental education, which resulted in an EFL publication entitled *Places for Environmental Education*. One statement in that booklet provided the foundation for this publication:

"Major capital expenditures are not necessary for schools to mount effective programs in environmental education. On the contrary, perhaps the most effective and successful programs use existing school plants and sites as the primary facilities for environmental studies. By expanding this concept for all existing community resources and developing cooperative regional and district-wide plans, every school in the country should be able to enter the environmental education arena."

Environmental Education/Facility Resources illustrates that the financial crisis in education need not deter administrators and teachers from launching, or sustaining, environmental education programs. New buildings are not essential, because where indoor learning places are necessary, the existing facilities can be used. Most of the facilities for environmental education already exist, and so all that a teaching staff needs to do is consolidate what is around its school or community.

Hopefully, this book contains the proper mix of information about human and natural resources in a wide-scale approach to environmental education, so that our youth, and particularly those in the cities, will learn to understand the delicate and critical relationship that exists between the man-made and the natural resources that sustain them.

Introduction

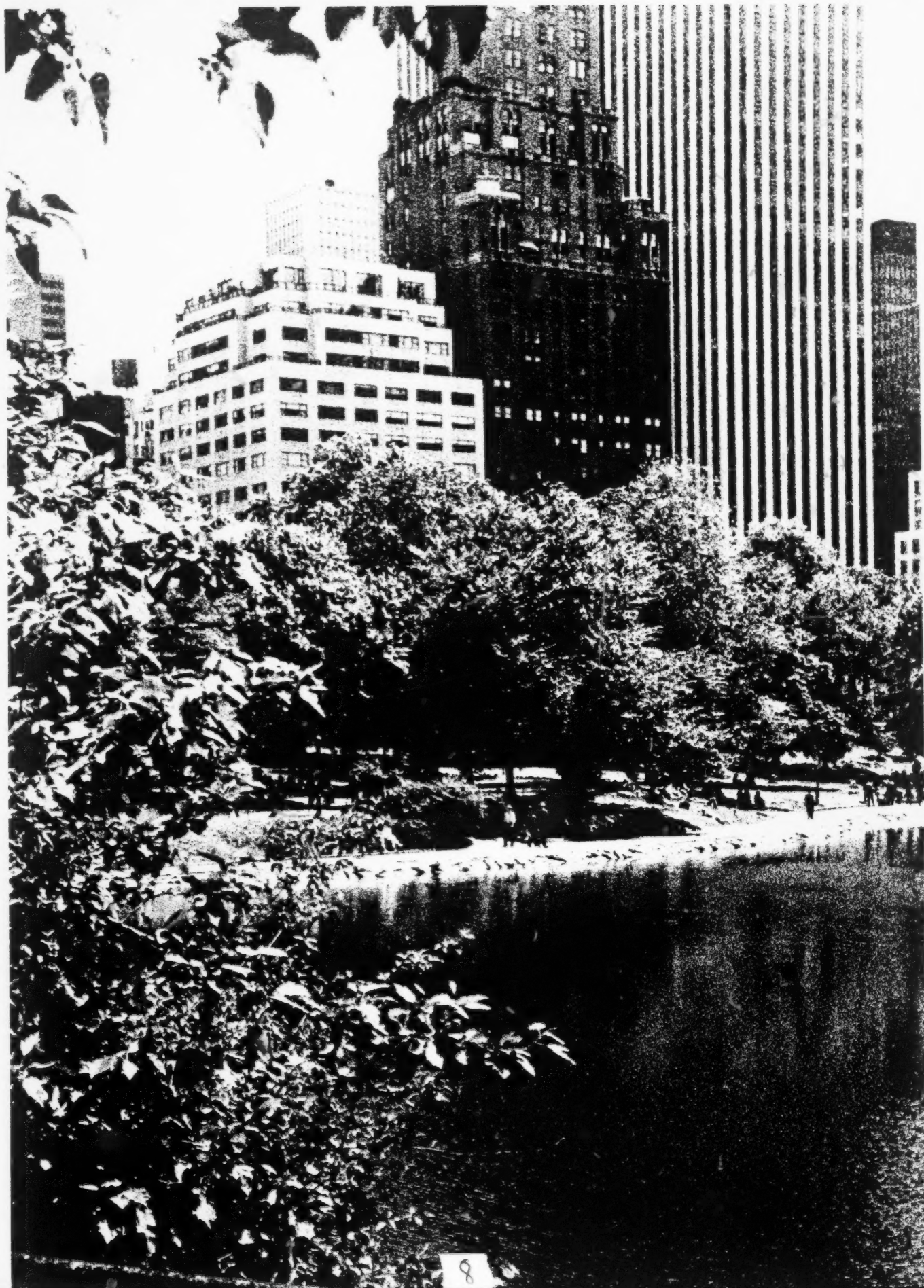


Environmental education is meant to improve the quality of life by making students aware of the world around them and motivating them to work toward making it a better world. The subject requires facilities on a different scale from other subjects. In general educational usage, the word "facilities" refers to the physical structure in which learning takes place. In environmental education, the meaning widens to include all the places where this education takes place, as well as the things that facilitate learning. These can be urban or rural, man-made or natural, public or private, and sophisticated or primitive. This means that resources also serve as facilities. For this reason, *Environmental Education/Facility Resources* departs from other EFL publications by not addressing itself to the design of buildings and their equipment. Instead, it tells how to mine the treasure of places and things existing in the national parks, in schools, and in communities around them, and suggests ways to use them for effective programs in environmental education.

A widely used method of teaching environmental education, the strand approach, is advocated by the NPS in its National Environmental Study Area (NESA) program. This method weaves strands of environmental information through regular subjects and incorporates environmental experiences and encounters with the inquiry method to create an integrated education program. The NPS believes that the strand approach will lead students to a good understanding of the uses and abuses of their environment.

Whatever method is used, the facilities for environmental education can be classified into a pattern of concentric circles. The school building and the school site are in the center circle, the community surrounding the school in the next circle, and the distant community and natural sites are in the outer circle. Because each circle takes students farther from their schools, the facility can also be classified by distance: e.g., a "lunch bag away," a "day trip away" or a "sleep-over distance away."

By providing experiences at facilities in all of these circles, educators can offer an integrated program which covers the widest variety of educational opportunities for their students.



The School and School Site



It's easy to overlook the most obvious and most easily accessible facilities in favor of the expensive and remote places which sometimes prove to be impractical for educational use. Every school child has a schoolhouse, and every schoolhouse has its own grounds. These schools and grounds offer the most accessible facilities for environmental education.

Theodore Osmundson, former president of the American Society of Landscape Architects, received support from the American Conservation Association and EFL to make a nationwide survey of environmental programs and facilities. He concluded that the school site is "our richest untapped environmental education resource." William Stapp, Professor of Resource Planning and Conservation at the University of Michigan, says, "The potential for developing environmental education facilities within a school is limited only by the boundaries of one's imagination, resourcefulness and enthusiasm."

As a place for environmental education, the school and its school site offer these characteristics:

- They are readily available and familiar to the students.
- Their use involves no major logistical problem, such as transportation, insurance, rescheduling of teachers and students, food service, special clothes and equipment, shelter.
- They are good places to begin an environmental education program, because all they require is an interested teacher with a minimum of administrative support.
- If the school and school site are understood and made "revealing," they generate a wide variety of environmental education

opportunities. In other words, the school and its site can provide a rich program if we're smart enough and motivated enough to use them effectively.

A program of environmental education can begin with the school and its site with no initial capital investment. After the program is underway, modest capital investments for equipment such as testing devices, collection, examination and display apparatus can be added. Eventually, special laboratories, aquariums, vivariums, greenhouses, and other improvements can be added, but they are certainly not necessary to launch the program.

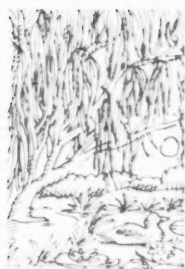
However, there are several conditions implicit in the effective use of the school and school site—the building and its site must be made accessible and revealable. Students should be able to get into the boiler room, up onto the roof, out onto the site, and into all the nooks and crannies that make a school function. A great untapped resource is the school custodian. His English may not be impeccable, but his knowledge can be immense. A wise denizen of the boiler room may relate better to many children than does the professionally polished teacher.

Some site management may be required in the sense of designating areas of the site for projects, special apparatus, observation areas, and so on. Above all, there must be the administrative support that gives teachers and students full use of the school and site and the opportunities they afford for environmental education.

Dealing with the school and school site also provides opportunities to relate its environmental conditions to the surrounding neighborhood and the community at large—for instance, the relationship of water supply and waste, the relationship of power generation and supply throughout the community, the relationship of transportation and communication to and from the school with the issues of communication and transportation throughout the neighborhood and region, etc.

When the school and site are used for environmental education, persons who are associated with the school in non-teaching roles can join in the educational process: maintenance and janitorial staff, food service, policemen and firemen, utility company and telephone installers, and parents and students.

There is good reason to believe that schoolhouses themselves are often bad neighbors. The 19th-century schoolhouses depress neighborhood morale by advertising to all that public sources were once vigorous and flourishing, but in a previous century. And now the ancient schoolhouse, still standing beside the road like "a ragged beggar sunning," declares to all that the education of children is of low priority. Plato said, "That which is honored in a country will prosper there." But in many big cities it is obvious that education has not been honored. Indeed, many of these old bastions are now major sources of pollution.



Morgan Elementary School

To realize the full potential of the school facility as a learning laboratory, certain preliminary steps should be taken. These were stated in a previous EFL report, entitled *Places for Environmental Education*:

- recognize that the school plant and environs can be used for environmental studies
- inventory the school site and plant to identify available resources and determine how they can be best used, e.g., geographical characteristics of the site, physical features of the building, environmental problems on the site
- identify good and bad characteristics of the site, programs needed, facilities necessary for a comprehensive program
- determine site areas and nearby areas that can be developed
- invite student, faculty, and community participation in the planning process, priority determination, and implementation
- open the school plant for extended programming
- establish an environmental studies laboratory within the plant
- reveal the school building's structure and mechanical services so students can see how the building works.



1. One of the better examples of a school using its facilities for an environmental education curriculum is in Utica, Mich. The acreage around the Morgan Elementary School was left in its natural state so that trees, shrubs, wildlife, and other ecological realities could be studied at first hand. The children have done most of the planting in and around the school. Open classrooms abound with environmentally oriented programs at every subject level. The walls are covered with student work on subjects of ecology and environmental concern. Geography and social studies are studied in the surrounding woods and in homes. Neighborhood institutions and the mechanical equipment rooms of the schools swarm with students learning at first hand how their lives are affected by the environment in which they study.

Science teachers and students test water and air content, collect soils, and together investigate the possibilities of a new school policy to eliminate incineration. The art that decorates the halls centers on environmental themes, as do the collages and scrapbooks which the youngest children assemble. Under the direction of JoAnne Burgess, who is coordinator of Environmental Education, a series of grade level environmental experiences have been developed by the faculty, which is committed to the philosophy of running an environmental strand through all curriculum matters. The school's principal, Richard Gwinn, meets regularly with student, parent, and community groups to keep the school in the focus of community environmental affairs. (From *Places for Environmental Education*)



Junior High School 141, Bronx, N.Y.



The Acorn Montessori School

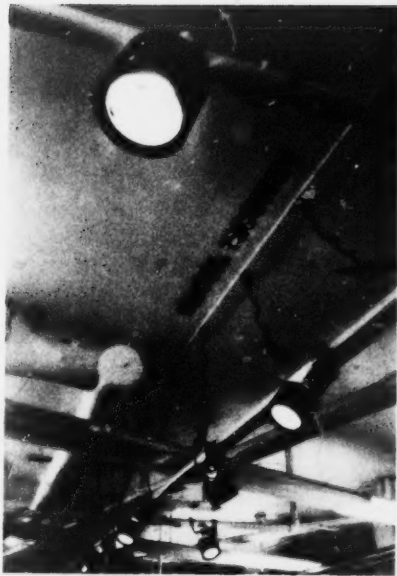


The Acorn Montessori School

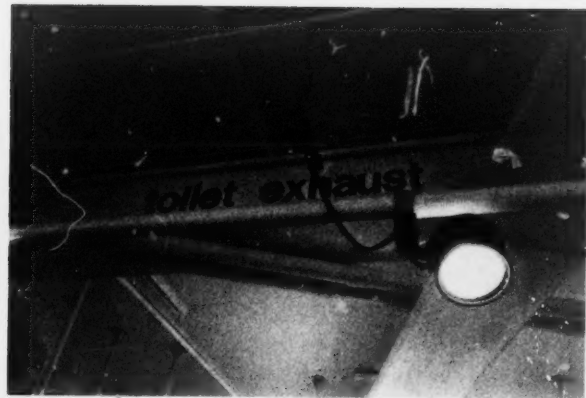
2. School roofs are used in many places as weather stations and for monitoring air and sound quality.

3. Exposed ducts and plumbing lines are clearly identified for children to follow in The Acorn Montessori School in New York City. Similarly, the Casady School in Oklahoma City color codes its service lines so that students can easily identify and understand the supply system which supports their school.

4. Environmental education courses are interwoven throughout the strong academically motivated curriculum of the Lawrence Junior High School in a suburb of New York City. The school uses its superintendent of buildings and grounds as a teacher and his "classroom" in the basement reveals the waste disposal, heating and plumbing systems to the students. These lessons provide an introduction to several considerations for community environmental action.



The Acorn Montessori School



The Acorn Montessori School



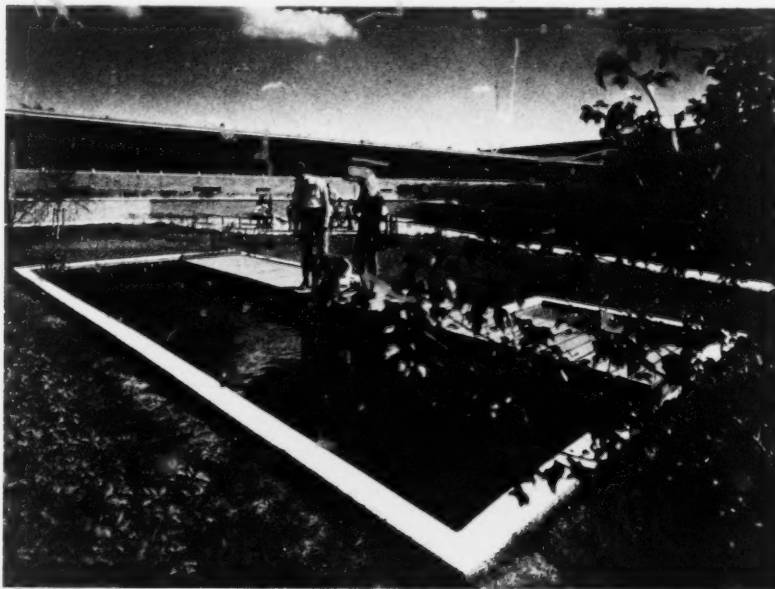
Lawrence Junior High School



5. Lyons Township H.S. in Western Springs, Illinois, built a courtyard specifically for environmental studies.

6. The Evanston Township High School in Evanston, Illinois, built a vivarium between its biology laboratories for students to study the interaction and inter-relationship in a mini ecosystem of plants and animals, birds and reptiles.

7. The Thomas Kelly School, San Juan Unified School District, Sacramento County, California. A 4½-acre oak-studded site adjacent to the outdoor physical education area has a pond, an amphitheatre, mountain sections and natural flora and fauna of the region. It serves as the central facility for environmental studies for K-6 students, who assume an almost paternalistic stance towards its protection. Hence, this unfenced haven for wildlife and plants is almost completely free of vandalism.



Lyons Township High School



Evanston Township High School

8. Mt. Diablo Elementary School, Mt. Diablo Unified School District, near San Francisco. An 80' x 300' strip next to the play field has been set aside for environmental education. It is carefully constructed, planted and maintained by the students with funds raised by themselves.

9. Garfield High School, East Los Angeles. Although not specifically used for a program of environmental education, the courtyard supports the thesis that attractively planned school sites will be appreciated and preserved by students. In spite of extensive school ground vandalism at other high schools in the area, Garfield students make maximum use of their courtyard without defacing or destroying it.

10. The Haslett, Michigan, School District developed a comprehensive K-12 program in environmental education. It has an 85-acre site adjacent to the combined high school, middle school and elementary school where 8th grade students are re-erecting a 102-year-old pioneer log house which was donated to the district. The year-round program publishes a monthly newsletter for grades 1-5 and a teacher manual for all grades. All 5th grade students participate in a week-long winter camp; there is also a junior high camp for boys, and a summer day camp for grades 1-6. Teachers' workshops run throughout the year with resource personnel from Michigan State University.



Mt. Diablo Elementary School



Thomas Kelly School



Garfield High School

11. The Washington Environmental Yard (WEY) Project at the University of California's Washington Laboratory School in Berkeley calls for a new perception in education in which the existing school building will become the adjunct facility for education, complementing the other facilities present in the immediate environs of the school. An old, traditional school building in a heavily populated multi-racial area is in the center of an entire block devoted exclusively to environmental education and to developing desirable ethics and environmental practices in urban communities. The university plans to develop this center as a model for teacher training in the field of environmental education.

Dr. Herbert Wong, the principal, heads an active advisory council of school board members, university personnel, community residents and representatives of governmental and private agencies. The council has proposed facilities which relate the classical ecological concepts of nature and conservation to the imperatives of urban living and survival. They plan to use rooftops, sub-surface areas, adjoining streets, the support systems and the people of the block to make the program truly an integral part of the life of the community. The school site will be interlaced with ponds, several outdoor study areas, wooded informal meditation and relaxation areas, adventure playgrounds for children, and many sites for the study of natural resources. Scientific and laboratory equipment necessary for urban environmental study (weather instruments, pollution monitoring devices, audio-visual materials, etc.) will be housed in a media center connected to outdoor workshop courts. Creative play areas harmonize with unspoiled and untrampled study areas.

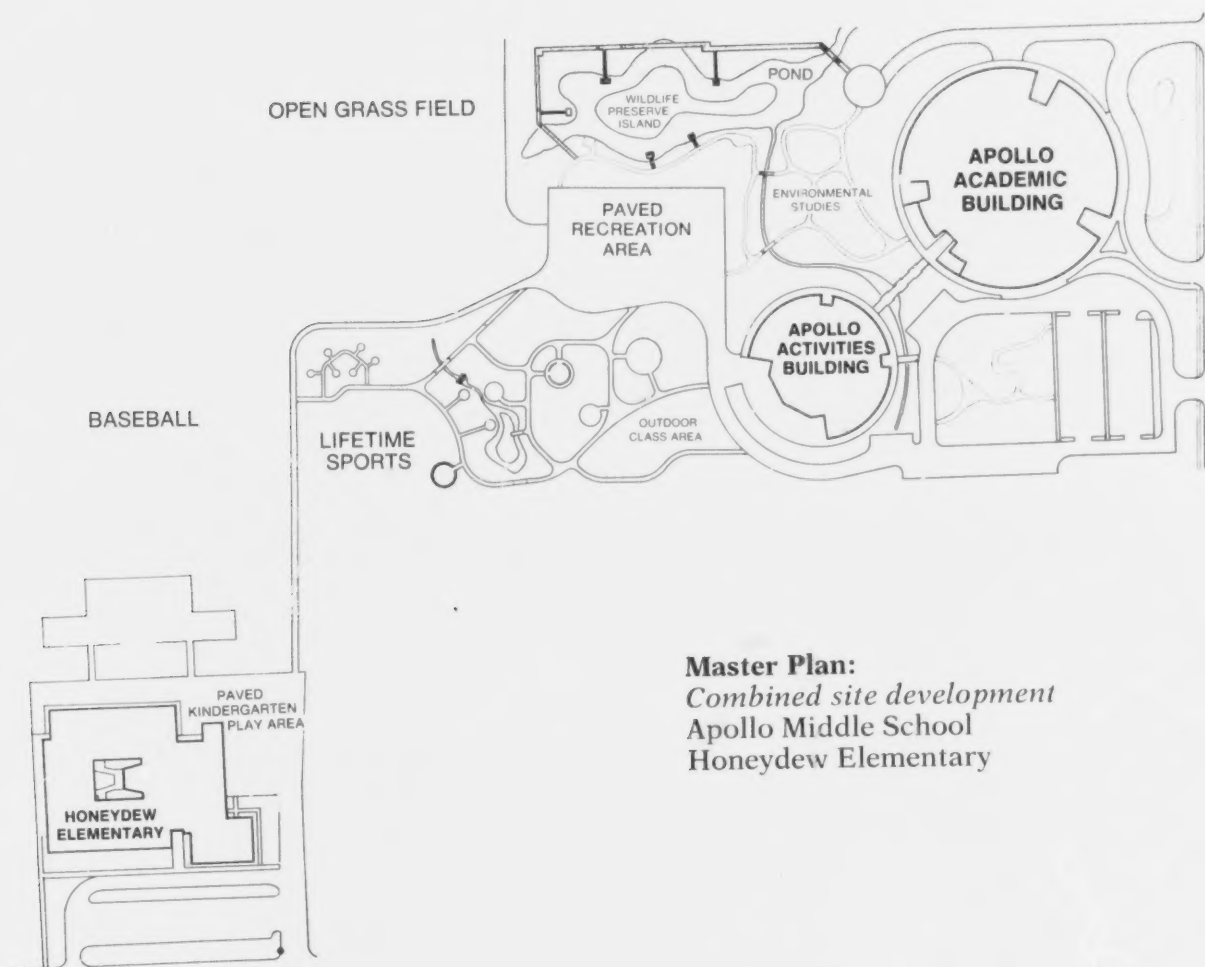
12. Apollo School and Honeydew School, Renton, Washington. The master plan for the combined site development of these urban schools just outside Seattle epitomizes the near ideal for on-site environmental education facilities.

The existing 12-acre Honeydew site is a bleak, traditionally paved site with the hard surfaces literally emanating from the outside walls of the school.

In contrast, the 20-acre Apollo site contains high ground and swampy areas, replete with numerous species of trees, flowers, shrubs, animals and birds. Water courses throughout the site.

The planners combined the sites and facilities of both schools, which are adjacent to each other, into a totally integrated plan that accommodates recreation and environmental education and conserves the natural areas and several outdoor class areas without infringing upon the ecological balance or the beauty of the 32-acre site.

The new circular Apollo Academic Building is surrounded by environmental study areas, arboretums, plant life sanctuaries, an outdoor amphitheatre, outdoor classrooms, trails, rock identification walls, water trails, natural material bridges and informal meeting places. These are all contiguous to the academic and activities building. A wildlife preserve island is planned in the center of the pond and an elevated boardwalk surrounds this study area so that when pupils and community residents are at the site they will not affect any of the natural elements. The whole setting is one of beauty, but filled with the facility components for exceptional environmental education on an urban site. Renton is an outstanding example of how school sites can be developed in harmony with desirable ecological principles while still providing all the needed elements for today's (and tomorrow's) educational needs.



Master Plan:
Combined site development
 Apollo Middle School
 Honeydew Elementary

Community Facilities



In the few years of nationwide attention to the crisis of our earth's environment, there has been a gradual and philosophically significant reordering of priorities in environmental education. While the natural ecosystem continues to demand protection and understanding, environmentalists are directing education toward the preservation of heavily populated urban centers, and their suburban neighbors. It's as important for students in suburbia and in the country to use community resources as it is for students in the city.

The city and suburbs are fraught with the problems of metropolitan living. As Dr. Rene Dubos said, "The greatest crime committed in American cities may not be murder, rape or robbery, but rather the wholesale and constant exposure of children to noise, ugliness and garbage in the street, thereby conditioning them to accept public squalor as the normal state of affairs."

How do we break the back of this syndrome of despair? The cities are financially bankrupt. Inner-city education is reeling under the blows of critical attack. New school building and construction projects are hard to come by, and if available, will

probably first serve the needs of the three R's. Where, then, can environmental education fit into the total educational picture? Where will this learning take place?

The answer lies in the existing community itself, in its schools and its institutions. Major educational and environmental agencies have begun to speak out strongly about the need to bring environmental education into the cities and suburbs and the need to use the cities and suburbs as essential resources for environmental education.

The use of community facilities for environmental education is part of a larger trend toward moving educational programs out into the community. It puts students into the real world where rich resources of people, places and processes can be tapped for educational purposes. This trend is in part a response to the issue of relevancy in education; in part it's economics; and in part it's a means of broadening the educational opportunities that have been restricted by the four walls of the schoolhouse and the people it contains.

Although the community facilities may be familiar to the students, they can take on a new life when visited and analyzed for an environmental learning program. Accessible community facilities include the waterworks, power plant, garbage dump, building excavations, sewage plant, parks, swamp areas, seashores, commercial businesses, manufacturing plants, museums and government offices.

When identifying community facilities, it is often important to find adjacent or nearby gathering places where students, teachers and resource persons can meet before and after site visits. When visiting outdoor facilities, these places can also provide staff and students with shelter from the weather.

The use of community facilities requires some latitude in the scheduling of students and teachers and requires extra planning for transportation, insurance, food service, arrangements for visits and the involvement of people in the community facilities. However, the planning need not be overwhelming; with a modest amount of administrative support, an individual teacher can make good use of community facilities.

Some preparation of the students through related programs in the school will enhance the study. So will follow-up after using the community facility, or bringing into the school the persons that had been involved at the site.

The National Audubon Society, the National Wildlife Federation, the Boards of Education of New York City, Philadelphia and Denver, the Group for Environmental Education and several educational publishers have prepared materials in recent months all focusing on using urban experiences and existing urban institutions to develop programs of environmental education for city children.

The interest in urban environmental education is apparent in the curriculum developed by faculty and students for the environmental quality program at the innovative Hampshire College in Amherst, Massachusetts. Subject areas include:

- Theater, art and music as environment
- Urban ecology, the interaction of man and insect parasites, and the adaptation of plant and animals to city living
- Waste disposal in Holyoke
- The economics of pollution
- The urban environment
- Public health problems of an urban community

The possibilities for environmental education are almost unlimited in an urban center.

Participants in a workshop in St. Louis studied the resources of the city in order to identify them for application to generalized study for any urban center. The workshop was conducted by the National Education Association and National Park Service at the National Environmental Study Area at the Gateway Arch.

St. Louis has all the classic syndromes of a troubled inner city, and its community resources and facilities will serve to illustrate the vast possibilities that exist in any urban center. Its dominant natural feature is the Mississippi River, with its variety of opportunities to study water flow, sources of pollution, bank erosion, habitation in and along the river, impact of the river on industry, commerce and history, and other topics. The NESAs strands easily incorporate the many historical implications inherent in the Mississippi and its endless flow.

In addition to the evident natural features, this site has many excellent man-made facilities for studying the urban environment. The Old Courthouse, site of the Dred Scott trial in



St. Louis

1847, is a priceless facility for architectural study, historical insight and political precedent, which could bear heavily on any program of environmental education.

Eads Bridge, opened in 1874, was the first railroad link from east to west. Children can systematically trace the development and history of railroading and its economic implications for St. Louis. The aesthetics and technical considerations of architecture, art, construction technology and design can all be studied at this one facility.

The paddlewheel boats which plied the Mississippi supply the focal point for the study of river transportation. Interwoven with the romanticism of life on the river are extraordinary possibilities for involving practically every school discipline into an environmental strand, e.g., development of music and art of the region, changing agricultural crops and industrial cargo, flood control, means of transportation and the historical influences of the river on the development of the country. The Port of St. Louis, the largest inland port on the river, handles petroleum, grain, iron, steel, coal, chemicals, sugar and many other marketable commodities. The operation of the port can provide fascinating environmental studies for children. For example, merely by focusing on wheat, students learn its origin, destination, soil type and the climate best for its growth, processing requirements and the factors which contribute to its nutritional value.

The world's largest brewery is located in St. Louis. Studies relating economic considerations to factors which contribute to air, water and odor pollution are possible. Opportunities exist to study harmonious solutions to environmental problems, as well as to develop civic beautification projects in which the brewery has played a major role. The interdependence of community and industry can be studied by examining the unique position that brewing occupies in the life of St. Louis.

By studying the architecture, construction and programs of the new Busch Civic Stadium, students can begin to understand the need for adequate urban recreation spaces and programs.

Interstate Highways 55 and 70 literally pass under the Gateway ESA. Classes can safely observe the highways for signs of auto pollution, traffic patterns, auto counts, truck carriers and their cargoes, highway construction materials, highway safety, parking facilities and all other factors involved with mass interstate traffic running through the center city. All these can lead to an understanding of how neighborhoods are affected by auto traffic and what must be done to improve neighborhood living through intelligent mass transportation plans.

The Robert Koch Hospital for tubercular patients would be a dramatic facility resource for teaching children about the effects of industrial air pollution.

St. Louis has a wide range of industries: power plants, chemical plants, railroad car and boat building, and oil storage plants on the river. Industries can raise their public relations image enormously by inviting schools to conduct environmental education studies at the sites. Assuming that the companies are committing no environmental malpractices, they can show students how enlightened management balances industrial needs with sound ecological practices.

The foregoing facilities are environmental education facilities, because they require a total look at where man lives, how he lives, and why he lives. Environmental education seeks to know where man has been, where he is now, where he is going, and how he has moved along this sequential path. By using the facilities and understanding the factors that have brought man to this juncture of life in St. Louis, choices and alternatives can be sought to provide an improved quality of life. Since environmental education must lead to effective action, change by political means is a reasonable expectation of a generation of youth that is being taught to understand for themselves the environmental imperatives implicit in urban living.

St. Louis is not unique. New York, Cleveland, San Francisco, Chicago, Detroit and every other urban center in this country has its counterpart in St. Louis's riverfront facilities. They have courthouses, old schoolhouses, interstate highways, polluted rivers, industrial plants which can be reviewed, studied and improved by concerned and concerted public action.

They also have their counterparts of riverboat captains and bridge builders and railroad engineers and airport managers who can impart a feeling of the interrelationship of past and present in transportation. What were the environmental effects of steam locomotion, and are they similar to those of jet engines? How are railroad stations and airports similar? And what lessons of city life can be learned from the demise of the railroads as a means of mass public transportation?

Although Rousseau looked upon cities as the sink of the human race, many years before, Socrates said, "fields and trees teach me nothing, but the people in the city do." No matter what the point of view, the facilities of the city have much to teach us about how man can survive in his cities.

Some cities are using their community institutions in different ways for environmental education. Resources that are being used include libraries, shopping centers, police and fire stations, waste disposal facilities, transportation centers, camps, museums, planetariums—the list is endless. Some examples:

1. Denver's program of environmental education is rather typical of programs in other urban centers in the manner in which it reaches out to the community to utilize the vast potential of resources and institutions found there. It is rather atypical in the scope and size of its program.



Balarat Center for Environmental Education

Balarat Center for Environmental Education



The total environmental education program for the schools comes under the aegis of the Balarat Center for Environmental Education, Balarat being the name of Denver's 750-acre wilderness site for environmental studies about 50 miles northwest of the city in the Rocky Mountains. A staff of thirteen professionals administers the program, with help from eight high school students working full time and receiving full academic credit. The Denver environmental education program is paid for by tax-supported local educational funds, except for some small matching federal funds which finance an "Outward Bound" teacher-training program in the summer.

In the city itself, students use the South Platte River as a learning area. This river courses through the heart of Denver and affords many opportunities for the study of erosion, pollution, patterns of river movement, etc. In addition to using the river as a study site, an action program undertaken by the Denver students cleaned up a good part of its banks and trees were replanted along its riverfront. The Chatfield Dam, administered by the U.S. Army Corps of Engineers, is used for lessons in flood control. Other inner-city facilities which are regularly used by Denver students are the Denver Botanic Gardens, the Denver Museum of Natural History, the City Park Zoo, the City's sewage disposal plants, the Plains Conservation Center, a large paper re-cycling plant, and the 900-acre Deer Creek Nature Center with its two old farms and old schoolhouse, plus lots of space to study the ecology of a short grass prairie. Places of environmental interest in the immediate locale of particular schools include bridges, viaducts, city planning offices, the civic center, neighborhoods and bus depots. Children travel to these places either on foot or by specially equipped buses which are operated by the Balarat program. Some buses have over-sized brakes for use in the Rockies, and some have tape-recorded environmental talks.

Moving out of the community-based concentric circle, Denver pupils also take day trips to the wilderness site where they have a chance to study the forest, meadows, streams and ponds. Plans are underway to develop resident facilities at the Balarat wilderness site so children can stay for a week.

Over 18,000 children a year participate in the one-day community-based environmental education experiences provided by this program. Community workshops, teacher training courses and advanced courses for high school student aides have been outgrowths of this program. Nearly one hundred students are involved regularly and voluntarily in a Students for Balarat Club, which is in the forefront of innovative projects of environmental concern in the public schools.



Students and Urban Society (SUS)



Students and Urban Society (SUS)

The United States Forest Service, the National Park Service and several colleges in Colorado work cooperatively with the Balarat staff to develop the full potential contained within the scope of the Balarat concept. As a result of the success of the program to date, 1,400 additional acres have been offered free for use for environmental education by the Denver Public Schools.

2. In a blighted area of Brooklyn, junior high school students operated under a Title I program called "Students and Urban Society" (SUS) in which they literally catalogued the physical characteristics of their entire immediate school environment. They surveyed empty lots, gutted buildings, broken fire hydrants, abandoned autos, garbage-strewn streets and housing projects. They studied the architecture of their community, worked with community planners, and integrated their findings into almost all of their classwork. They participated in the political processes and in community action programs organized to improve community living. They developed a major anti-drug program. The significant aspect of this SUS program is that the students used the entire community as a facility for learning and directed their program to improving the local environment.

3. John Dewey High School is located near the famous beach at Coney Island in New York City. The beach has become an important educational facility for the school's marine biology students to learn about coastal pollution and accompanying environmental problems. Classes shuttle back and forth in school buses to use the beach as a living laboratory. The natural resources of the shore complement the sophisticated technical equipment at the school. Students use a 95-ft catamaran owned by the City University of New York to study other local coastal environmental problems.



John Dewey High School



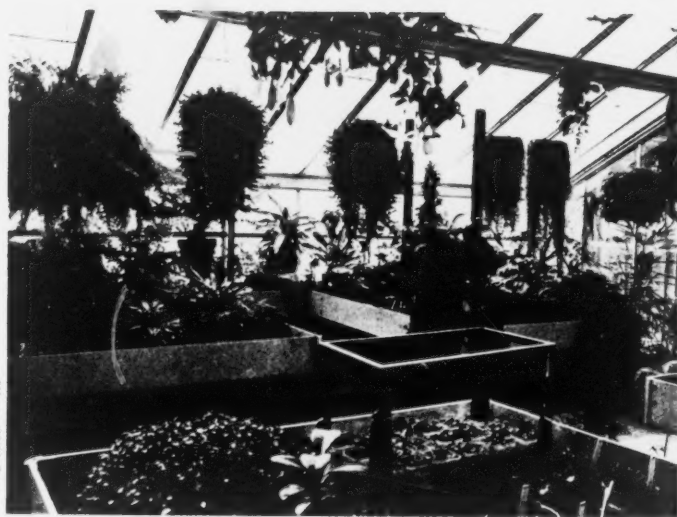
Similarly, a city-owned recreation building on the beach at Biscayne Bay (The Crandon Park Center) in Miami is used by the Dade County School System as a central facility for a sixth-grade environmental education program. Students use the beach and adjacent dunes to study marine life and the many associated curriculum items usually present at any beachfront.

4. Elementary classes in a New York City school district use piers, islands, the waterfront and the streets of the city for an environmental study area. Children use Governor's Island, a military enclave in the harbor, to study water ecology and to interact socially and educationally with military families living there. They have conducted gull censuses for the Audubon Society, reported on the garbage conditions of the streets near their school, and watched garbage scows being towed out for dumping solid wastes at sea.

5. The Milwaukee Public Schools use a mobile environmental laboratory to take environmental educational programs to the schools. The van is equipped with three teaching stations containing scientific equipment for the study of pollution and ecology. By use of a portable generator and by plugging into the school power supply, the van becomes another classroom without the necessity of building additional rooms or laboratories.

Similarly, Project ECO (Environmental Curriculum Opportunity) of the Ames Community School District in Ames, Iowa, has developed a well-equipped, highly sophisticated mobile laboratory for peripatetic environmental educational specialists to take children "where the action is" in the field, where they can perform immediate experimentation and analysis and on-site studies. Inclement weather does not hamper their activity, since the large van can be used as a shelter and lunch spot during these times. A similar mobile lab, the Environvan developed by the NPS, operates in and around Washington, D.C.

Wave Hill Center



Wave Hill Center

6. Milwaukee also uses an excursion boat as a floating environmental educational facility. Children and teachers, prepared beforehand with work books and materials, sail through the three rivers and harbor in Milwaukee to study the pollution and traffic problems of the city. The schools also use the city's planetarium, zoo, the Museum of Natural History, an outdoor study center and public forest for programs in environmental education. Milwaukee also offers environmental education programs for adults.

7. Many areas close to an inner city have a natural or rural "feel" that provide interesting facilities for urban studies. These places are generally a "lunch bag" distance from school. New York City uses the environmental resources of the Bronx Zoo and Botanical Gardens, the American Museum of Natural History, the Aquarium, and the Wildlife Refuges in nine city parks. It also uses two valuable facilities: The Wave Hill Center for Environmental Study and the High Rock Park Environmental Study Center. Wave Hill comprises two mansions, greenhouses and grounds located on a magnificent site overlooking the Hudson River. Two colleges within easy walking distance of Wave Hill use the facility for educational purposes. This piece of "country in the city" is only a short train or bus ride from teeming inner-city population centers.

High Rock Park is on Staten Island, a more suburban borough of New York City. It can be reached by a 30-minute ferry ride across New York Harbor that is one of the best environmental facility bargains in the country. High Rock has been left almost completely in its natural state—70 acres of undeveloped woodlands with a few simple buildings for assembly and display. Both High Rock and Wave Hill provide training programs for teachers and the public and distribute material concerning urban environmental matters.



SCOPE



Del Norte County

Both were recently designated by the National Park Service as National Environmental Education Landmarks. The NEEL Program attempts to identify, preserve, and encourage environmental education programs and facilities of national significance. Designation of a site as a NEEL is testimony to its contribution to environmental education, and thus qualifies the facility for technical assistance and other aids from the National Park Service. A NEEL can be privately owned or operated by agencies of the local government. The NEEL program serves as an important motivational force in the development of worthwhile programs throughout the country.

8. Suffolk County Organization for the Promotion of Education, a cooperative educational service supported by the school districts in Suffolk County, N.Y., has developed programs in which teachers and students use canoes to investigate the waterways and wetlands as a means of monitoring environmental abuses, and to study the water ecology and associated environmental problems of the area.

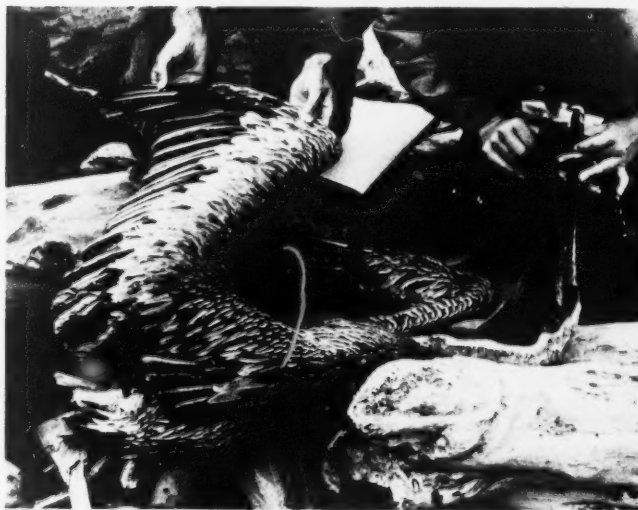
9. The Natural Resources Institute of the University of Maryland assists local school systems in developing programs in environmental education, particularly in understanding the ecological problems of Chesapeake Bay. The programs are based in resident camps and the Chesapeake Biological Laboratory on Solomons Island. Several instructional stations for marine biology are located along a 750-ft pier.

Rural Community Resources and Facilities

Most of the examples of community facilities previously cited are particularly applicable to urban and suburban areas. Rural communities similarly have a treasure of resources for environmental education. Just as St. Louis was dissected for study purposes, we now look rather closely at the community around the Redwood National Park in northern California, the site of another NEA-NPS workshop.

The classic confrontation between conserving redwoods and harvesting them to save a rural economy provides the basis for an environmental study of this region of northern California, and has implications for other rural communities around the country.

Crescent City, in Del Norte County, has a permanent population of about 3,500, but attracts thousands of visitors during the year because of the surrounding redwoods in the state and national parks. The workshop, which was developed around innumerable facilities, none of which were built for education, identified environmental problems of that particular area. It resulted in the use of property owned by federal, state and local governments as well as commercial and private property. Four general types of resources and facilities were categorized into groupings which have meaning for any community.



Del Norte County

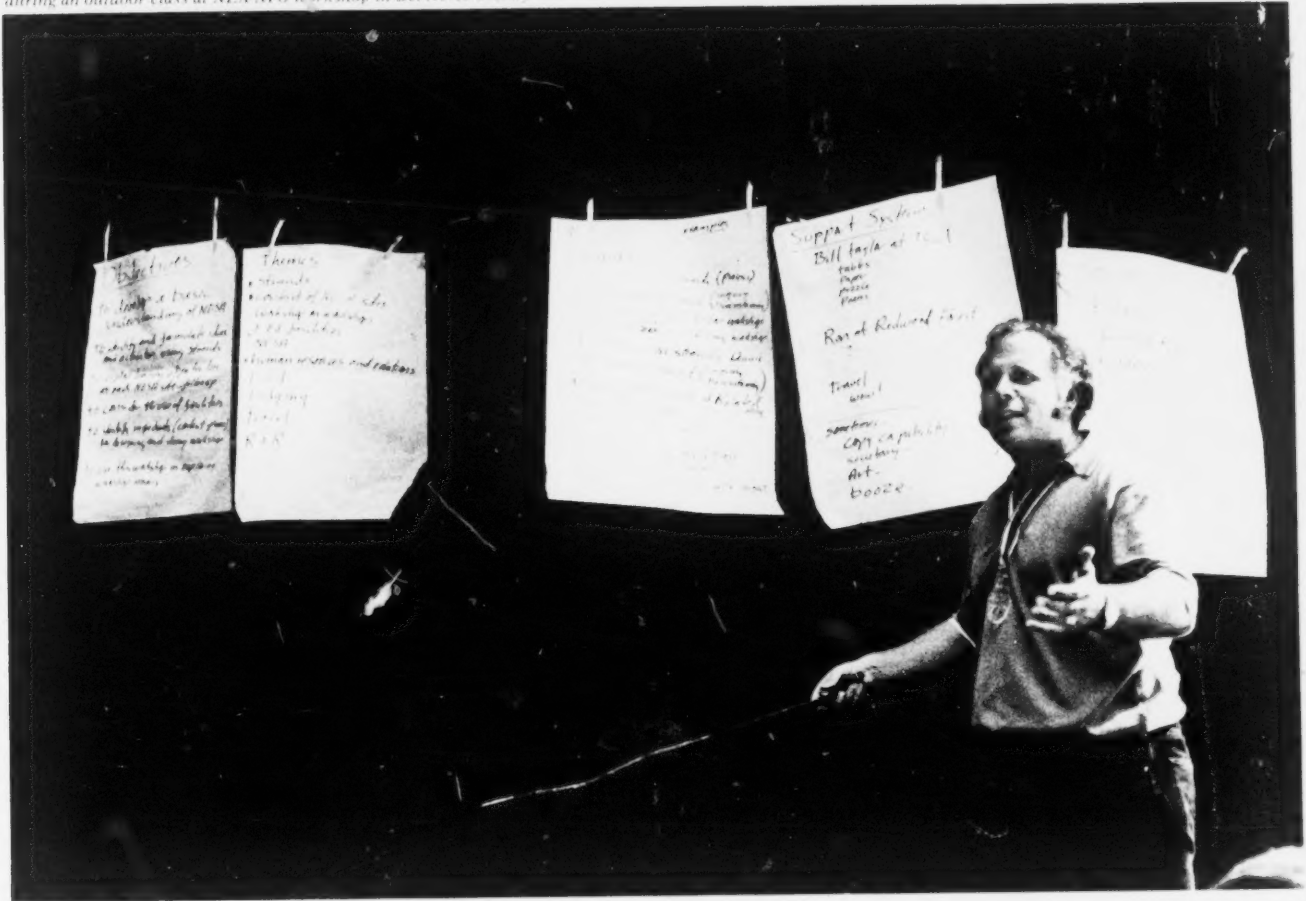


Del Norte County



Del Norte County

Lecturer on environmental education pins posters on trunk of giant redwood during an outdoor class at NEA-NPS workshop in Del Norte County.



A. Natural Sites (The Coastal and Mountain Regions)

1. ocean tides
2. water
3. forests
4. cleared areas

Within these sites can be studied the whole range of catastrophic natural phenomena such as earthquakes, faults and flooding. Erosion, seashore ecology, recreation, logging and clear cutting, power generation and the marine life of the ocean are all environmental matters which can similarly be studied in these natural sites.

B. Public Works Facilities

1. city dump
2. the harbor at Crescent City
3. the county schools
4. public land

These facilities provide a firsthand operational model of how local government can influence the environment in which its residents live.

C. Commercial Resources

1. *oil tanks*
2. *tankers*
3. *lumber mills and logging operations*
4. *housing*
5. *commercial fisheries*

Since industry and commerce make decisions closely related to environmental quality, it is important for students to understand the factors which contribute to these decisions and to consider ways of bringing about a commonality of interest among industry, public administrators and education.

D. Historical Sites and Tourist Attractions

The qualities and resources which contribute to the uniqueness of a particular community can frequently be utilized for effective lessons in matters of local environmental concern. Sites include monuments, historic replicas and museums.

There are some common threads which are readily identified in these facilities and resources:

1. None are "traditional" educational facilities, but all are valuable as places for learning.
2. These resources easily accommodate the environmental strands that relate learning to living.
3. They all exist for purposes other than schooling. Therefore, they are not built, owned or financed by the school board.
4. Many of the facilities are in the public domain and therefore available for school use.
5. They all contain expert and interested human resources.
6. Their counterparts can be easily identified in just about every community in the country.
7. They probably require transportation for students.
8. Finally, and most important, they all focus directly on man and his environment: Why his life is this way, how it has changed, and how natural and man-made factors influence the way in which he lives.

Regional Centers



Regional centers provide a third level of environmental education experiences. Their use should be related to the nearby community experiences as well as to the opportunities afforded by the immediate school and school site. They should also be models of exemplary building design and management.

Students will visit these centers for at least a full day and often for several days. Therefore, logistical and administrative support is important, particularly for transportation, insurance, scheduling of students and teachers, staffing and staff support, food service, sleeping facilities, instructional materials, and the like. Even if the facilities are provided free of charge and the program is put together by the teachers and on-site personnel, some costs will be involved.

Also, there are physical requirements—shelter for group gatherings, project activities, preparation and follow-up after experiences on the site, food service, and possibly overnight accommodations. Most often, these regional centers will have some existing facilities, since they tend to be private or public camps, county, state or national parks, nature centers, or the like. If a regional center doesn't have sufficient facilities, they may have to be provided before the center becomes appropriate for environmental education activities.

Regional facilities are frequently shared by school districts, schools and colleges or schools and public and private agencies concerned with environmental issues. Often these joint ventures will not only provide educational experiences but will also provide settings for the training of personnel in environmental education, including interns from schools of education, forestry and conservation.

Within the bounds of economics and efficient administration and service, facilities in regional centers should be decentralized into small-scale clusters so that each cluster deals with no more than about 100 students.

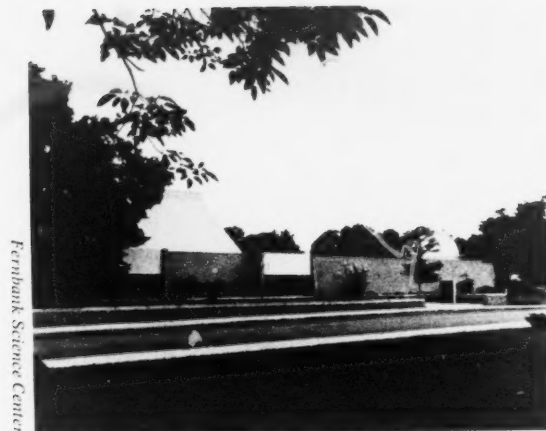
Finally, it is important to recognize that experiences provided in regional centers will often have their counterparts in community and school site opportunities. For instance, if a project involves the inventory and analysis of the wildlife in a state forest, the students could also study the wildlife of their own community and examine the wildlife, however modest, on the school site.

Non-Resident Regional Centers

1. The Kalamazoo Nature Center for Environmental Education (Kalamazoo, Michigan) began its varied program of research, education and conservation in 1961. It provides the public with information about the natural environment and man's dependence upon it. The Center consists of an interpretive center, hundreds of acres of natural areas, farmland and trails, an arboretum, a day camp, barnyard and exhibits. It serves over 100,000 children and adults each year from the areas around Kalamazoo, and gives college credit courses for teachers and students in association with some of the region's colleges. The Center is operated as a private corporation with funds raised from endowments, membership and service fees, and special donations. It serves as a model for cooperative public-private ventures serving a broad public interest.



Kalamazoo Nature Center



2. The Fernbank Science Center, a division of the DeKalb County School System in Georgia, is an outstanding regional center for science and environmental education. A combination of public, private and government funds (Title III ESEA and Title III NDEA) were joined to develop a forest, a planetarium, an electron microscope, meteorological laboratory, a library and many supporting services and exhibit areas. Originally developed as a science center, Fernbank's program and facilities have been expanded to meet the environmental education needs of the region. It serves DeKalb County students from elementary grades through graduate school and offers programs for teachers, the public and the handicapped.

3. The Monument Environmental Education Center site of the U.S. Forest Service is on 1,240 acres of an abandoned tree nursery 21 miles north of Colorado Springs. It is used as a day trip site by school children from Colorado Springs and metropolitan Denver. The center was developed as a cooperative project between the Forest Service and the Colorado Springs School District. Potential school dropouts from the city are employed at the environmental education site to renovate buildings and develop ponds for ecology study.

4. SCOPE (Suffolk County Organization for the Promotion of Education) is an educational cooperative in New York State that uses many county facilities for school and public programs in environmental education. SCOPE is funded by the county school districts to offer programs of enrichment for the students. At a state park, SCOPE runs a facility which contains laboratory equipment, meeting rooms and monitoring stations. An environmental education staff serves school children, teachers, supervisors and the general public. SCOPE works cooperatively with several public and private agencies, including the Long Island State Park Commission, the state Department of Environmental Conservation, and the State University of New York.

5. The previously cited Balarat site of the Denver Public Schools has access to 3,500 acres of the adjacent Roosevelt National Forest. Together with its own acreage and trails, it is frequently used as a center for groups from metropolitan Denver.

Resident Centers

A one-week resident educational environment-centered camp for 5th and 6th graders is becoming a regular part of many school curriculums. These resident camps started originally as school camping and outdoor education programs. Many of these programs still maintain the name of outdoor education, but much of what has been incorporated into them today is called environmental education. Where programs are actually designated environmental education, there is often emphasis on relating what is learned in the natural environment to what happens in the man-made environment. The change in terminology from outdoor education to environmental education appears to be symbolic of the subtle change in emphasis from a focus on the natural environment to a broader consideration of man's total environment, including population, pollution, transportation, etc.

Implications for Building Resident Facilities

Although the natural environment can serve as a major educational facility in any program, facilities can be built that would greatly enhance the opportunities for learning. The objectives of environmental education, particularly for urban schools, interlaced as they are with social, emotional, political as well as educational considerations, can be fully met only when all the elements of effective teaching and cooperative living are brought together. Among the contributing elements are facilities for the educational process.

Resident sites offer an opportunity to depart from the customary education locations. The outdoor setting for learning is a departure from the familiar classroom setting. In many cases, orientation and preparation for teaching in this new setting is critical to the success of the instructional process. There is evidence that children accept and adapt rather readily to the outdoor setting for learning much more easily than others who are accustomed by habit and history to structured programs conducted in the confines of the walls of a room or building.

When planning resident centers to be used by city children, the facilities must accommodate many classes at different times and for different reasons. Unlike facilities for suburban or rural schools that can be built solely for education, facilities for an inner city school district usually serve as an environmental education center, a community conference site, a summer resident camp for children and adults, a recreational site for year-round use and other purposes. So, plans must be developed to incorporate the specific needs of urban communities whose resident environmental education site might be the only natural area available to hundreds of thousands of city dwellers. Multi-purpose, convertible facilities for total community use should be the goal. There are certain facility concepts which urban educational planners should consider in planning for an environmental education resident center.

Sociological and Group Living Needs

Environmental education for urban children offers a variety of benefits in addition to the expected gain in knowledge of the environmental sciences. Many educators feel that these "extras" are perhaps more important. Resident centers provide opportunities for interaction among children and between children and adults. The benefit of good meals in pleasant surroundings is obvious. So, environmental education sites must include facilities that contribute to and foster these sociological values.

The following should be considered:

— Buildings must fit the outdoors, not merely be transplanted "city" buildings. Simple, uncluttered lines are desirable, and indigenous materials should be used. One of the most dramatic sights in the dining room of New York City's Fresh Air Fund Camp Hayden is a roof beam supported by a huge oak tree and by two enormous glacial boulders.

— Sleeping cabins should accommodate no more than 12 people, and dining room tables should provide for family-style meals for six or eight children. Every effort should be made to avoid any institutionalized style of facilities that lump children into large, impersonal groups for the sake of administrative expediency. The small group feeling is essential and provides easy access to the adult leader or teacher. Understanding, integration and cooperation have a better chance of success where children are involved in small, workable groups.

— Sleeping quarters should be designed so that the adult leaders can live "in," yet apart. Privacy must be provided for the teachers, yet their presence should be felt. This arrangement provides children with the elements of independent living but still assures them of the security of the presence of an adult. At the same time, teachers can exert their influence for the benefit of the group experience without having to share the intimacies of daily living.



Camp Hayden

— Living accommodations should provide space for socializing. A reading room or study section is desirable for children to read, talk or write. A small reference center stocked with materials pertinent to environmental matters would provide the chance for informal study or individual research. In inclement weather or during quiet morning or evening hours, these areas would be of great value. The children can indulge in the luxury of unstructured talk in a setting quite different from home or classroom.

— All facilities must be designed to comfortably accommodate handicapped children. Although there is no literature to substantiate the assumption, the unhurried simplicity and fundamentalism of living in an outdoor setting may have particular value for handicapped youth, provided they are given ease and facility for routine movement.

If collecting specimens is part of the program, receptacles should be built into and around the children's living quarters, where the specimens can be studied, nurtured, and then returned to their natural habitat. Putting specimens in synthetic environments should reinforce students' attitudes toward the need for retaining natural environments wherever possible.

Educational Needs

Facilities must be planned around the uniqueness of the outdoor setting and what it can offer to environmental study. The following facilities are recommended:

Laboratories should be equipped with microscopes and other scientific equipment. Space for aquariums, terrariums and accommodation for other living specimens must be provided in a setting that will motivate children to further study and reinforce an understanding of the natural habitat.

Outdoor laboratory stations at which up to 10 pupils can study the many areas of environmental education should be available. These stations should be placed throughout the site so they harmonize with the natural surroundings. They could include a photography blind (planned with subject matter and light source in mind); a bird watching station; an animal observation station (where the feeding and watering habits of wildlife can be observed); an astronomy station with permanently fixed telescopes, charts, light source, etc.; a station where sketching and other art forms can take place; a water ecology station; a soil erosion station; a geology station; a plant and tree study station; pollution monitoring stations.

— Portable field kits must be developed as an instant facility for study. Testing and monitoring devices which can be easily carried by children would be most advantageous.

— An outdoor meeting site should be developed to accommodate meetings of large groups when necessary. An amphitheatre with a lake or mountain backdrop is ideal but planners must consider comfort, acoustics, lighting and insect controls.

— Provisions should be made for individual places where children can talk with their teachers or other staff members. The usual guidance suite approach should be avoided. Unlabeled conference places can be either indoors or outdoors, either formal or informal. Some should be equipped with testing and recording apparatus and other educational tools which might help children to solve their problems.

— Nature trails should be developed without disturbing the natural aspects of the woods. The trails should help children to become aware of species of trees and animals in their natural environment, and understand it. The tracing of a mountain stream, the imprint of the ages upon the woods, the ecological development of the forests, the ravages of nature, the routine of animal life and the diversity of nature can all be followed on well-planned nature trails.

— Outdoor recreation facilities should be developed in any resident environmental education site, particularly on sites which will be used by all segments of an urban community.

For more information on resident facilities see *City to Country*, by Eugene M. Ezersky, published by EFL.

Because Title I and Title III funds are increasingly more difficult to obtain, school boards frequently seek other partners in initiating resident programs in environmental education. Partners can be found in government agencies (National Park Service, U.S. Forest Service), colleges, youth agencies (Boy Scouts, Girl Scouts, YMCA's, YWCA's, Boys' Clubs), quasi-public national agencies (Red Cross, Salvation Army) and private agencies and foundations.

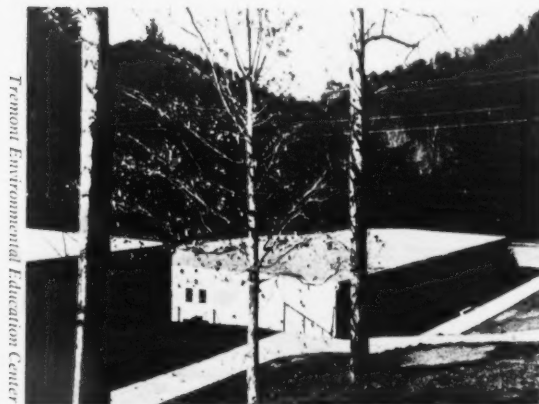
The following resident programs illustrate the wide range of partnership arrangements available to interested school systems:

1. The Tremont Environmental Education Center of Maryville College at Townsend, Tennessee, the site of still another National Education Association-National Parks Service workshop, provides a model for cooperative programs between private colleges, the National Park Service and local school districts. Tremont is a former Job Corps Center with housing and educational facilities suitable for resident programs in environmental education. It is located in the Great Smoky Mountains National Park and is operated by Maryville College under a special use permit granted by the NPS. The center serves 25 public schools systems within a 200-mile radius; about 150 pupils per week live at the site. Teachers conduct the programs with assistance from the resident staff and from the NPS. A minimal fee of \$20.00 is charged for lodging and meals for each child for the five days. When not in use by school groups, it is used on weekends for seminars and research by the college community and adult and church groups.

2. The Union College Environmental Education Center at the former Cumberland Gap Job Corps Center is also operated under a special use permit from NPS. Located in Middlesboro, Kentucky, in the Cumberland National Historic Park, the center operates year-round as a site for week-long resident programs for Cumberland area schools in three states. The 100-acre campus provides excellent facilities for programs for five classes a week. The facility is also used for campus retreats, a center for graduate and undergraduate studies in related fields, and for environmental study workshops.

There are many unused Job Corps Centers around the country that could be converted to resident facilities.

In addition to NPS National Environmental Study Areas mentioned in this publication, the NPS has resident facilities and cooperates in resident programs with local school systems at the Cape Cod National Seashore, at Catoctin Mountain Park in Frederick County, Maryland, and at the Whiskeytown National Recreation Area in California. All of these programs use the National Environmental Educational Development (NEED) program of the National Park Service.



Tremont Environmental Education Center



Catoctin Mountain Park



Catoctin Mountain Park

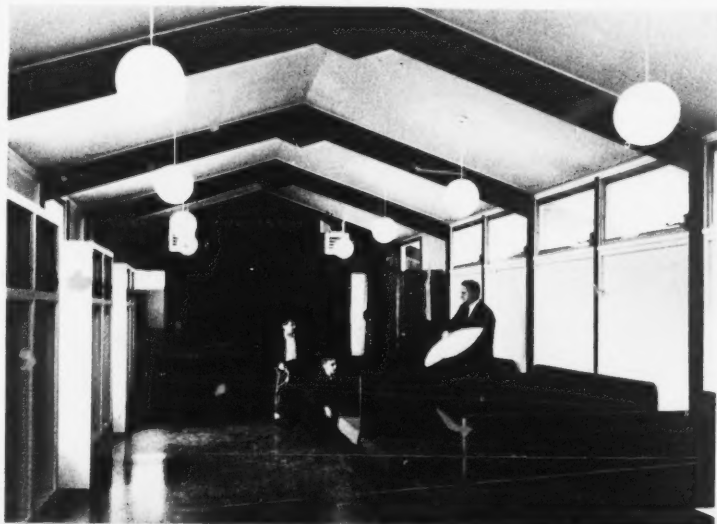




Fire Island National Seashore



TVA Land Between the Lakes



TVA Land Between the Lakes



Fire Island National Seashore



TVA Land Between the Lakes



3. The Regional Center for Environmental Education at Golden Pond, Kentucky, is a heavily used resource in the TVA Land Between the Lakes area. It is so popular that school districts from Kentucky, Tennessee, Indiana, Illinois and Missouri wait for vacancies. Day and resident facilities are available with program and maintenance staffs to assist. The Paducah, Kentucky, schools, for example, with 75 teachers trained in environmental education and using 50 junior and senior high school students as teaching aides, use Land Between the Lakes for a 5th and 8th graders resident program.

4. The Tacoma, Washington, School District #10 operates a 31-week outdoor resident program which started modestly sixteen years ago in one school. The program now serves over 3,000 students a year in three camps, each housing about 100 per week. One camp is state-owned, one is owned by the YMCA, and one by the Salvation Army. These facilities are leased by the school district, which is now in the process of developing its own 150-acre facility. School personnel are responsible for developing the program and teaching, with assistance from resident staff and specialists provided by the facility owners. Maintenance and repairs can be handled by the owner or lessee, or cooperatively.

5. On a much smaller scale, the bay, the dunes, the sunken forest and the ocean at the Fire Island National Seashore in New York are used by students of New York City's School District #14 as educational resources and facilities during one-week resident experiences. Students are housed in a former motel, and park rangers using materials from the NEED program assist school teachers as on-site instructors.

6. The Lorado Taft Field Campus, the outdoor education center of Northern Illinois University in Oregon, Illinois, serves as a resident center for schools, colleges and community groups in the region. The center is staffed by professionals from the university.

7. Seventeen school districts from suburban Nassau County in New York are members of the Board of Cooperative Educational Service (BOCES), which operates a year-round one-week resident experience for all 6th graders. The facility at Ashokan Field Campus of New York State University's College at New Paltz provides resident facilities for about 100 students at a time. The director and resident staff assist the schools in developing program and materials. This program has been running successfully for several years and is paid for by public educational funds. The schools now use three additional resident camps to accommodate the large number of schools enrolled in the program.

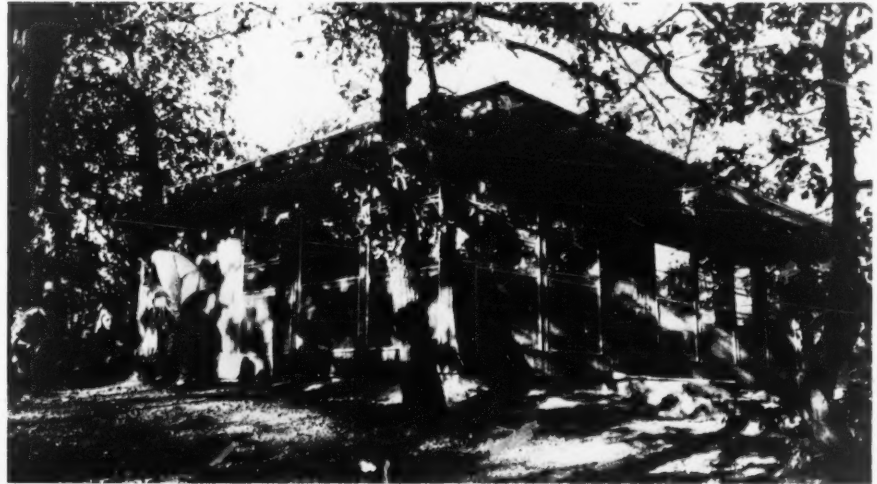
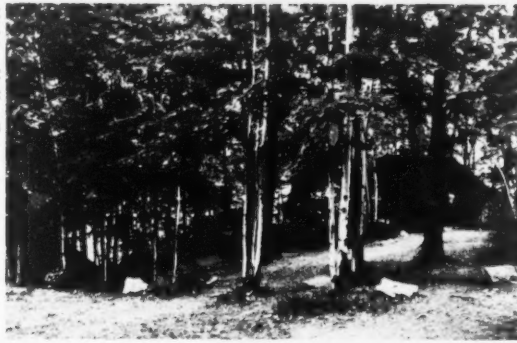
8. The Goddard Youth Camp is a beautifully appointed facility on 160 acres in the National Arbuckle Recreation Area in Oklahoma. The camp is owned by the Charles B. Goddard Foundation, which leases the land under a special use permit from the NPS. Goddard provides week-long programs of environmental education for five Texas and Oklahoma school districts and a dozen colleges. By operating 10 months a year, over 5,000 students can be served in comfortable facilities amid magnificent natural resources. In addition to serving the immediate region, Goddard offers resident programs for groups from as far away as Los Angeles, San Francisco and Memphis.

9. The Hidden Valley Camp, one of five Fresh Air Fund Camps located on 3,000 acres of the Sharpe Reservation about 90 miles from New York City, serves two functions. During the summer it provides two weeks or more of camping experience for children from New York City ghettos. During the other months, the camp becomes the site for outdoor and environmental education for many school districts in the Metropolitan New York area. This fortuitous arrangement enables schools to rent a well-equipped facility at minimal cost.

Most cities are ringed by camps belonging to social agencies, youth-serving agencies and private institutions. A growing tendency suggests that these camps could be made available for rental or sublease during the school year. With the extended school year gaining acceptance, school districts are considering lease arrangements as a means of providing an outdoor facility suitable all year long for environmental education and other curriculum needs. The alternative, of course, is for a school system to purchase and develop its own facility.

10. An unusually successful resident program has been underway for the last fifteen years at the Clemmie Gill School of Science and Conservation (SCICON) site operated by California's Tulare County Department of Education. A year-

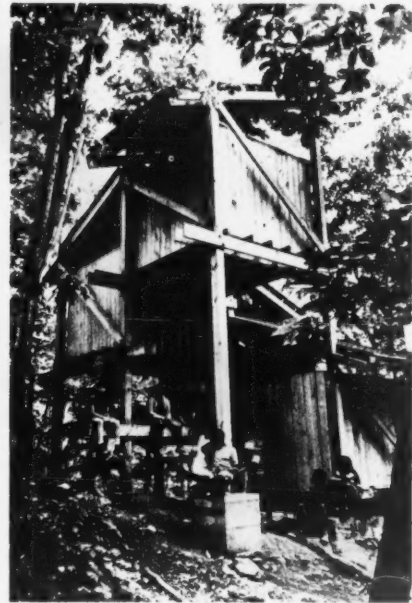
Hidden Valley Camp



Goddard Youth Camp



Hidden Valley Camp



Hidden Valley Camp



Hidden Valley Camp



SCICON



Kenai National Moose Range

round program accommodates 150 children each week in a well-designed program of environmental education. The school district owns 65 acres and leases 500 additional acres for \$1 per year. This land is adjacent to 367,000 acres of the Sequoia National Forest, where over 15 miles of trails are used by SCICON. This arrangement of owning, leasing and using land points up still another combination of methods for acquiring a site for a resident program of environmental education.

The buildings on the site (cabins, dormitories, dining and kitchen facilities, conference areas), which blend harmoniously into the natural setting, were all built in a "do-it-yourself" fashion by volunteer help and staff participating in the program. Children attending the program help to maintain the trails and contribute in other ways to the development of the site.

This year, over 400 college students applied for the 15 positions open for interns in SCICON. Interns are paid, receive college credits, and are trained as program aides. When schools are not in session in Tulare County, the SCICON site is used for conferences and other programs by college and community groups in the region.



Clear Creek Camp

11. One of the oldest continuously operating resident programs is conducted by the Los Angeles City Schools at its Clear Creek Camp in the San Gabriel Mountains. The city has worked in cooperation with the U.S. Forest Service for 45 years to run this year-round facility which served almost 10,000 Los Angeles school children last year.

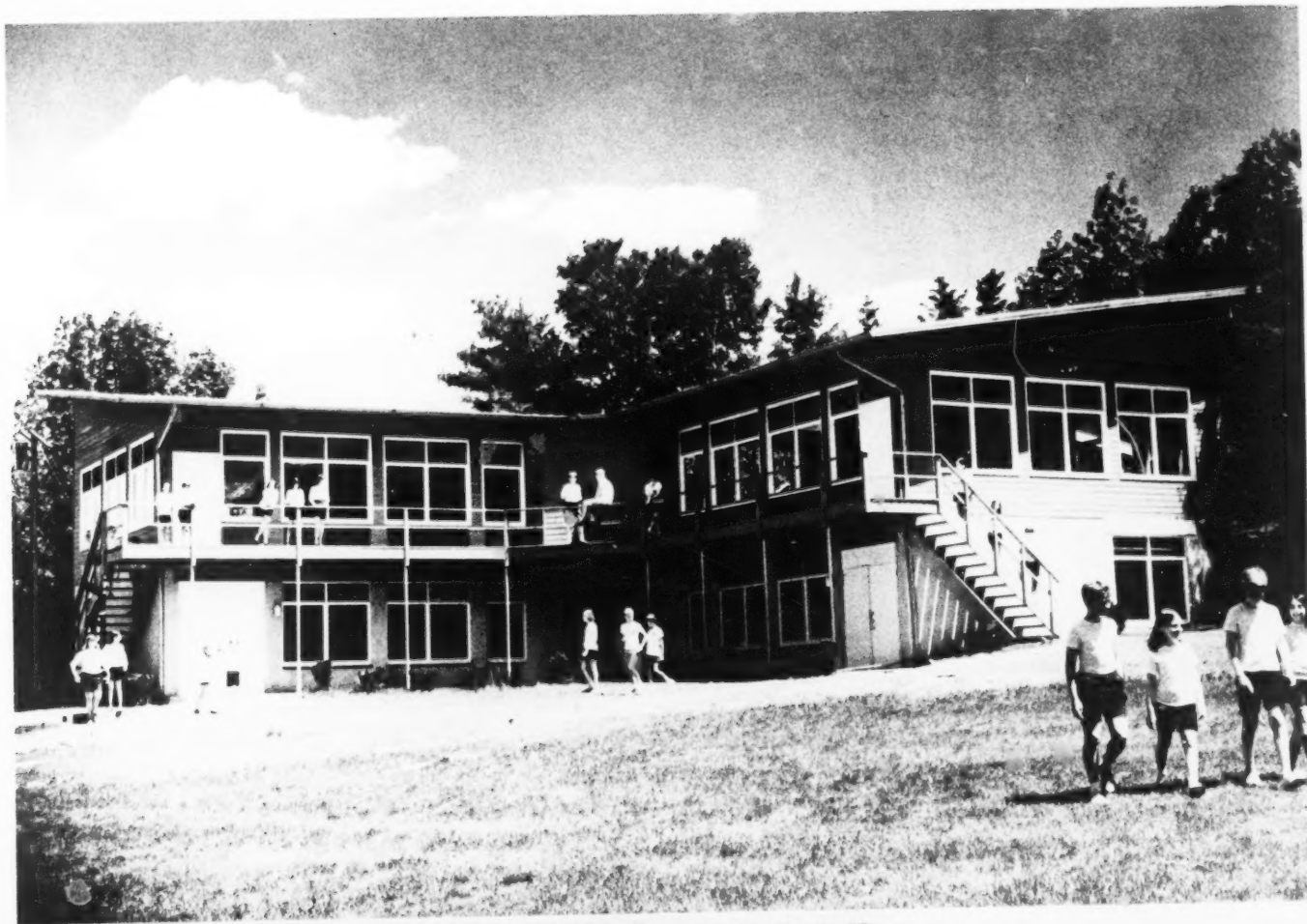
12. A different kind of resident center is operated by the Kenai Peninsula Borough School District in Soldotna, Alaska. On 40 acres of land made available on the Kenai National Moose Range by the U.S. Department of Fish and Wildlife, 6th grade pupils live and study in tents in rather pristine surroundings. Since none of the facilities are heated at this site where the average mean temperature is 40°F, students and teachers use the campfire as their center for learning about environmental ethics, decisions, contamination and quality. The resident program is directed towards analyzing and solving some local environmental issues of "spaceship earth." According to Peter E. Larson, the director of this program, pupils have the additional good fortune of being serenaded to sleep by "the call of the arctic loon, the screech of the great gray owl, the hoot of the great horned owl, and occasionally by a chorus of coyotes." The enthusiasm of the pupils supports the contention that any appropriate space can be developed quite simply and effectively into an important facility for environmental education.

13. Pittsburgh operates a cooperative resident program in outdoor and environmental education by leasing a YMCA camp for a three-day resident program for 6th graders. About 2,000 youngsters are served each school year, and if the facilities are winterized, even more will attend. Another YMCA facility, Camp Sloane in Lakeville, Connecticut, is winterized so that it can be used throughout the school year by many students for their resident program in environmental education.

Among other regional and resident programs underway throughout the country, these are representative: The Lake Erie Junior Nature and Science Center in Bay Village, Ohio, accommodates handicapped children; the program of the Marshfield Public Schools in Marshfield, Wisconsin; numerous state, county, and city parks and facilities used by students in and around the California State College of Pennsylvania; the Title III ESEA Natural Resources Education-Demonstration Center in DeKalb County, Illinois; the program of the Alamogordo, New Mexico, public schools which uses the ESA at the White Sands National Monument; the environmental program and facilities of the Greencastle-Antrim School District of Pennsylvania.

The above resident programs are included in this publication to indicate that there is a wide variety of cooperative efforts around the country. Many more programs of equal merit are in operation, but there is not sufficient space to list them all.

Outdoor education resident programs were started many years ago in pioneering projects such as Battle Creek, Michigan, and Newton, Massachusetts. Early leaders, including L. B. Sharp and Julian Smith, paved the way for subsequent developments. Many early programs have been in continuous operation and contributed significantly to environmental thinking through their focus on outdoor education.



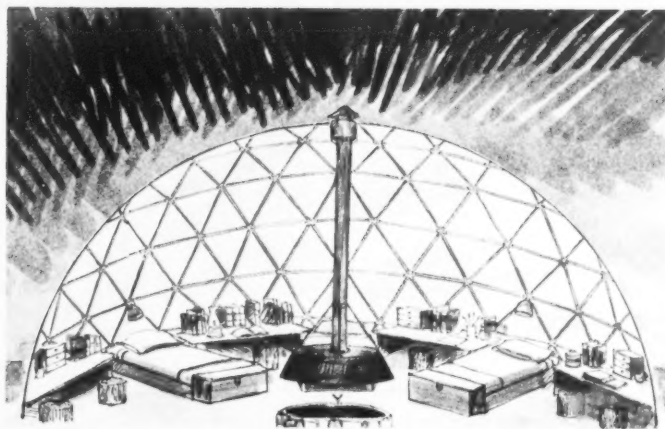
New and Planned Facilities



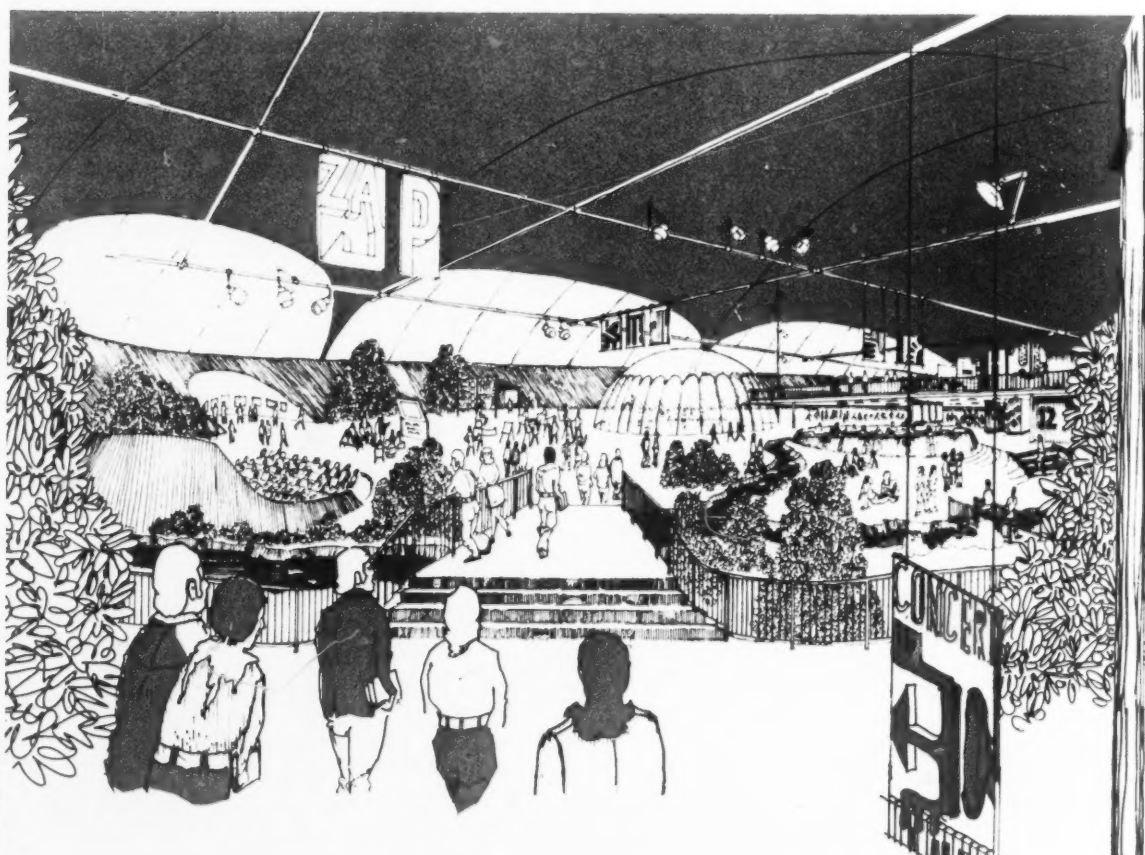
When planning facilities for environmental education, the ecological considerations of the site and buildings must be weighed as carefully as the educational possibilities. Design, landscaping, power sources, waste removal and all of the support services must be compatible with sound principles of ecology. Teaching children to develop a sound environmental ethic would be inappropriate in a building that contradicts what they are being taught, just as it would be inappropriate to espouse environmental procedures which are not practiced at the facility.

Fortunately, there is a building technology that lends itself well to facilities for environmental education. Air structures, which are membranes supported by air pressure, can enclose large areas at relatively low cost. They keep a low profile so that they do not intrude too much on the surroundings, and the membranes can admit sunlight to support the growth of plants. The simplest type of air structure is often used to enclose tennis courts; sophisticated types cover acres of space, such as the U.S. Pavilion at the World's Fair in Osaka.

The simple "air bubble" is transportable. It can be inflated as a facility on a school's hard-top area and then deflated and reassembled at a wilderness resident site without spoiling or affecting the natural environment. Bubbles of this sort can be used for shelter, as a laboratory, to house plants or animals, to use as monitoring stations and for just about any use.



Geodesic dome project



Air structure project

At TRIGOM (The Research Institute of the Gulf of Maine), a simple air bubble houses a laboratory for a marine biology program located directly on the rocky and windy coast of Northeastern Maine. If an oil spill or other ecological disaster required an instant shelter or laboratory anywhere along the Maine coastline, the building could be deflated, moved and reinflated at the site.

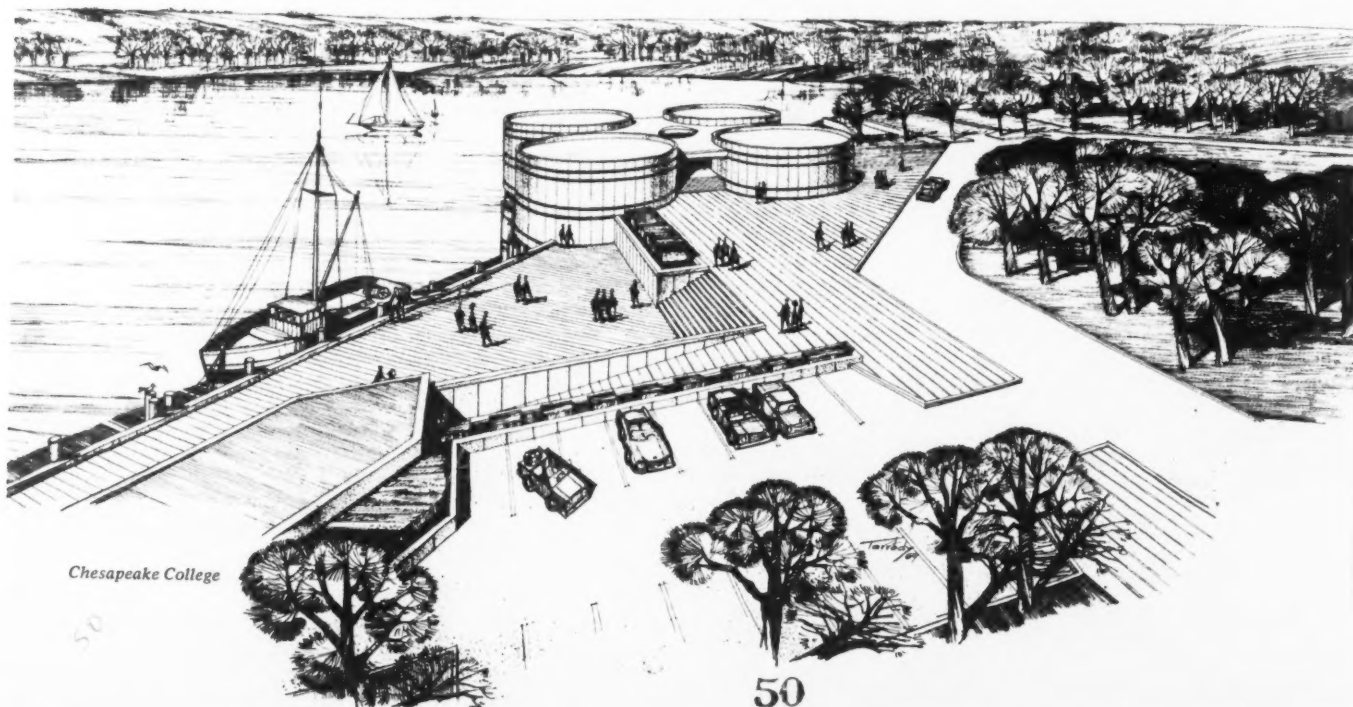
Another type of inexpensive building, the geodesic dome, can be assembled by school personnel. It can be disassembled and assembled elsewhere as need dictates. The frame can be covered with various types of membranes to provide a shelter, greenhouse or a building for environmental education.

Innovative ideas are now either on the drawing boards or under development by creative planners and architects all over the country.

Among these:

1. How do you study water ecology, limnology, and patterns of marine life without getting into the water and disturbing the things you wish to study and preserve? How do you avoid destroying property in order to build a facility to study the shoreline? At Reelfoot Lake State Park in Tennessee, construction is underway on a motel-on-the-lake which might help answer some of these questions. The motel is built on piers over the water and marsh areas, and the units are connected by walkways. This arrangement preserves trees and enhances the character of the lake. Primarily, this facility is being developed to accommodate visitors to state lands, but the architectural consultants see important implications for environmental education facilities in this model undertaking. By building study areas over a lake without destroying the shoreline, people can study siltation, waterlife, current movement and a whole array of environmental subjects related to the lake.

2. Another interesting plan for the study of marine environment was developed for Chesapeake College in Maryland. Four tank-like structures dominate the study center, spanning land and water so that the facility symbolically and actually bridges two environments. The specimen tanks and scientific laboratories are very much a part of the marine environment. Indeed, many environmental scientists have speculated widely on the feasibility of building cities over the ocean as a means to help solve environmental crises of overpopulation.



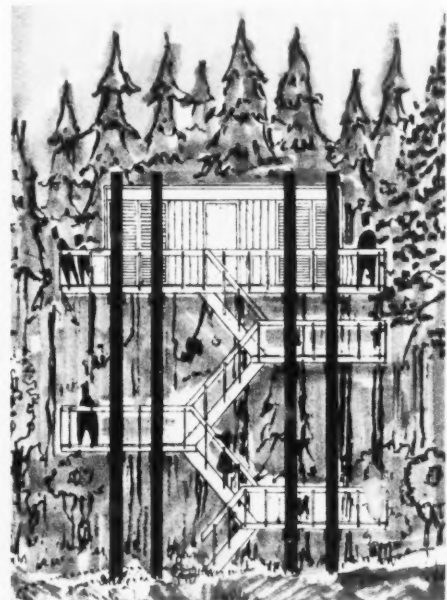
3. At the Hidden Valley facilities of the New York City Fresh Air Fund, a planetarium is being completed which will be as versatile as the Hayden Planetarium in Manhattan, but with the additional bonus of being completely automated. It will be the first major educational installation of planetarium equipment to be housed in an easily assembled prefabricated building. This planetarium will seat 50 pupils at a time. During the school year it will serve the schools in two counties, and during the summer it will be used by the camp children. Significantly, the whole facility, instruments and building, costs less than \$100,000, which makes it an environmental bargain, considering the tremendous number of children who will be served each year. With automated programs on tape, the services of an astronomer are not necessarily required. Program possibilities are almost unlimited; it can show the constellations, rocket programs, go back eons in time and study the changes in the sky, science and conservation-oriented programs, and programs for training students in related scientific fields.

4. The plans for the Environmental Education Center for Nolde Forest State Park in Berks County, Pennsylvania, include facilities for five major areas of study.

- Water resources (aquatic biology, water pollution)
- Earth resources (subsurface biology, geology, seismology, soil conservation)
- Biological resources (forestry practices, ornithology, plant succession, conservation)
- Meteorological resources (astronomy, air pollution, weather)
- Heritage resources (historical sites and buildings, old farms)



Reelfoot Lake State Park



Nolde Forest State Park



Wildwood School Project



Plans call for observation towers, treehouses, trails, indoor and outdoor laboratories, watershed trail facilities, an earth-bank cut station, specialized equipment such as a seismograph and meteorological instruments and mobile monitoring equipment. The 646 acres will be developed for one-day programs as well as for resident programs for students in the surrounding school districts. The resident facilities call for housing modules which can be easily repeated as the facility expands. The buildings will reflect the environment and blend with it harmoniously; wood, stone and glass are the primary materials. The buildings will be sited for minimal intrusion on the natural landscape, will be designed for year-round occupancy and include facilities for the handicapped. The Berks County School System will use the facility as an environmental education resource, but its influence extends to ten other counties within 60 miles of the site.

5. A wealth of innovative ideas for environmental education facilities has come from the Educational Research Group (ERG) in Aspen, Colo. Its braille trail at White River National Forest provides a multi-sensory experience for the sightless. The



Wildwood School Project

Group is developing an underground observation center where students can watch a beaver colony in its natural habitat. ERG proposes that students build geodesic domes for living quarters at resident environmental education centers. Students would be taught carpentry, masonry, tinsmithing and wiring while they enjoy the satisfaction of building the center.

ERG has designed an environmental education facility for pre-school children that is expected to be built at the Wildwood School in Aspen during 1972. It is designed to provide children with maximum exposure to the natural environment so that they can get a firsthand understanding of how it relates to and affects their own environment. Wildwood's organic architecture will provide exciting activities for young children—entering through a rabbit hole, walking behind a waterfall, looking up under a fish pond. Cave-like nooks containing an assortment of individual learning devices will surround larger open learning areas. Several different environments such as the ocean, desert, forest and swamp will be used and sensory modules will similarly be developed.

From Here, Forward

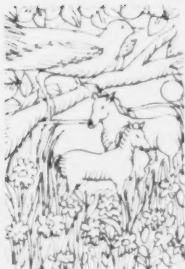
The rapid emergence of environmental education as an interdisciplinary educational subject has evolved through an interesting series of events in which national political and economic practices paralleled the attention given to the subject by the educational community. Historically, only the Sputnik motivated a thrust in American science education that even approached the plethora of proposals and suggestions advanced by professionals and laymen to deal with the environmental crisis.

First came the dramatic stories of the endangered species of trees and wildlife. Then attention turned to the threat to the existence of man himself. This was followed by the enactment of emergency legislation, much of which was ill-conceived and poorly regulated. Ecological activism abounded while long-range legislation was developed to improve the quality of the nation's environment. Means were sought for voluntary and legislated international cooperation. The crisis spawned a whole new ecological-industrial complex in American society. Accompanying these events were the efforts of the education community to introduce valid and educationally sound methods which would succeed in educating a whole generation of youth to an acceptable environmental ethic.

Education appeared to be the one constant interlaced through every program aimed at improving the environment. Where other programs dropped by the wayside, education gathered momentum as an important vehicle in the environmental struggle.

School programs now exist at every level, and they appear to be proliferating. The body of knowledge about environmental education has been expanded to include curriculum, methodology, resources and now facilities. The material in this publication focused on facilities was drawn from many areas of environmental education. In it is information that can be used in developing improved concepts and better programs in environmental education.





This publication results from a joint environmental education effort of the National Park Service, Office of Environmental Interpretation, U.S. Department of the Interior, Washington, D.C. 20240, and the National Education Association, Environmental Education Project, NEA Center, 1201-16th Street, N.W., Washington, D.C. 20036. Those particularly helpful with the development of this booklet are:

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Information Sources

National Park Service

*Information on NPS projects may be obtained from the
Environmental Education Specialist at NPS Regional Offices.*

National Capital Parks
1100 Ohio Drive, S.W.
Washington, D.C. 20242

Southeast Regional Office
3401 Whipple Street
Atlanta, Ga. 30344

Northeast Regional Office
143 South Third Street
Philadelphia, Pa. 19106

Midwest Regional Office
1709 Jackson Street
Omaha, Neb. 68102

Southwest Regional Office
P.O. Box 728
Santa Fe, N.M. 87501

Western Regional Office
P.O. Box 36063
San Francisco, Calif. 94102

Pacific Northwest Regional Office
4th & Pike Bldg., Room 931
Seattle, Wash. 98101

NESA Sites

National Capital Parks

National Capital Parks-East
5210 Indian Head Highway
Oxon Hill, Md. 20021

National Capital Parks-North
Box 8758
Washington, D.C. 20011

Catoctin Mountain Park
Thurmont, Md. 21788

George Washington Memorial Parkway
1400 Wilson Boulevard, Suite 102
Arlington, Va. 22209

Prince William Forest Park
Box 208
Triangle, Va. 22172

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Horseshoe Bend NMP
Route 1, Box 63
Daviston, Ala. 36256

Everglades National Park
P.O. Box 279
Homestead, Fla. 33030

Chickamauga & Chattanooga NMP
P.O. Box 2126
Ft. Oglethorpe, Ga. 30741

Kennesaw Mountain NBP
P.O. Box 1167
Marietta, Ga. 30060

Cumberland Gap NHP
P.O. Box 840
Middlesboro, Ky. 40965

Mammoth Cave NP
Mammoth Cave, Ky. 42259

Natchez Trace Parkway
Rural Route 5, NT-143
Tupelo, Miss. 38801

Cape Hatteras NS
P.O. Box 457
Manteo, N.C. 27954

Kings Mountain NMP
P.O. Box 31
Kings Mountain, N.C. 28086

Blue Ridge Parkway
Suite 703, Northwestern Bank Building
Asheville, N.C. 28801

Fort Sumter NM
Drawer R
Sullivan's Island, S.C. 29482

Fort Donelson NMP
P.O. Box F
Dover, Tenn. 37058

Great Smoky Mountains NP
Gatlinburg, Tenn. 37738

Shiloh NMP & Cemetery
Shiloh, Tenn. 38376

Stones River NB & Cemetery
P.O. Box 1039
Murfreesboro, Tenn. 37130

San Juan NHS
P.O. Box 712
Old San Juan, P.R. 00902

Virgin Islands NP
P.O. Box 806, Charlotte Amalie
St. Thomas, V.I. 00801

Northeast Region

Lincoln Boyhood NM
Lincoln City, Ind. 47552

Assateague Island NS
Route 2, Box 294
Berlin, Md. 21811

Cape Cod NS
South Wellfleet, Mass. 02663

Minute Man NHP
P.O. Box 160
Concord, Mass. 01742

Pipestone NM
P.O. Box 727
Pipestone, Minn. 56164

Delaware Water Gap NRA
Highway I-80
Columbia, N.J. 07832

Morristown NHP
Morristown-Edison Group
National Park Service
P.O. Box 1136R
Morristown, N.J. 07960

Fire Island NS
P.O. Box 229
Patchogue, N.Y. 11772

Home of Franklin D. Roosevelt NHS
Hyde Park, Dutchess County, N.Y. 12538

Sagamore Hill NHS
MTD Route, Box 304
Oyster Bay, Long Island, N.Y. 11771

Gettysburg NMP & Cemetery
P.O. Box 70
Gettysburg, Pa. 17325

Hopewell Village NHS
R.D. #1, Box 315
Elverson, Pa. 19520

Appomattox Court House NHP
P.O. Box 218
Appomattox, Va. 24522

Colonial NHP
P.O. Box 210
Yorktown, Va. 23490

George Washington Birthplace NMon
Washington's Birthplace, Va. 22575

Petersburg NB
P.O. Box 549
Petersburg, Va. 23803

Richmond NBP
3215 East Broad Street
Richmond, Va. 23223

Shenandoah NP
Luray, Va. 22835

Midwest Region

Colorado NM
P.O. Box 438
Fruita, Colo. 81521

Curecanti NRA
834 South 10th Street
Montrose, Colo. 81401

Rocky Mountain NP
Estes Park, Colo. 80517

Jefferson National Expansion
Memorial NHS
11 North 4th Street
St. Louis, Mo. 63102

Ozark NSR
P.O. Box 448
Van Buren, Mo. 63965

Wilson's Creek NB
Route 2, Box 75
Republic, Mo. 65738

Glacier NP
West Glacier, Mont. 59936

Scotts Bluff NMon
P.O. Box 427
Gering, Neb. 69341

Arches NMon
Moab, Utah 84532

Grand Teton NP
P.O. Box 67
Moose, Wyo. 83012

Southwest Region

Arkansas Post NMem
Gillett, Ark. 72055

Hot Springs NP
P.O. Box 1219
Hot Springs NP, Ark. 71901

Bandelier NMon
Los Alamos, N.M. 87544

Capulin Mountain NMon
National Park Service
Capulin, N.M. 88414

White Sands NMon
P.O. Box 458
Alamogordo, N.M. 88310

Platt NP—Arbuckle RA
P.O. Box 201
Sulphur, Okla. 73086

Padre Island NS
P.O. Box 8560
Corpus Christi, Tex. 78412

Sanford RA
P.O. Box 325
Sanford, Tex. 79078

Western Region

Saguaro NMon
P.O. Box 17210
Tucson, Ariz. 85710

Joshua Tree NMon
P.O. Box 875
Twentynine Palms, Calif. 92277

Lassen Volcanic NP
Mineral, Calif. 96063

Muir Woods NMon
Mill Valley, Calif. 94941

Point Reyes NS
Point Reyes, Calif. 94956

Sequoia & Kings Canyon NP
Three Rivers, Calif. 93271

City of Refuge NHP
Honaunau, Kona, Hi. 96726

Hawaii Volcanoes NP
Hawaii Volcanoes NP, Hi. 96718

Lake Mead NRA
601 Nevada Highway
Boulder City, Nev. 89005

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- 14 Edward Zimdars, Principal
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- 14 William Leonard, Science Teacher
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- 14 Virginia Adams, Principal
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Carmichael, Calif. 95608
- 15 Kenneth Duckert
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5880 Mt. Zion Drive
Concord, Calif. 94521
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5101 East 6th Street
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- 50 McLeod, Ferrara and Ensign, A.I.A.
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- 51 *Nolde Forest State Park*
Planning Associates
Airport International Plaza
Bohemia, N.Y. 11716
- Wildwood School Project*
- 53 Robert B. Lewis, Director
49 Educational Research Group
(top pic) Post Office Box 2190
Aspen, Colo. 81611

Reports from EFL

*The following publications are available from EFL,
477 Madison Avenue, New York, N.Y. 10022.*

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Cooler schools make better learning environments. (1971) Single copies free, multiple copies \$0.25

AIR STRUCTURES FOR SCHOOL SPORTS

A study of air-supported shelters as housing for playfields, swimming pools, and other physical education activities. (1964) \$0.75

BRICKS AND MORTARBOARDS

A guide for the decision-makers in higher education: how the colleges and universities can provide enough space for burgeoning enrollments; how the space can be made adaptable to the inevitable changes in the educational process in the decades ahead. (1964) \$2.00

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An essay on the physical problems and trends in planning of urban colleges and universities and their potential role as a catalyst in the remaking of the cities. (1969) \$0.50

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A report on facilities present and future, needed to accommodate instructional television and other new educational programs. Prepared for EFL by Dave Chapman, Inc., Industrial Design. (1960) (Revised 1968) \$2.00

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A Stamford, Conn., school built with a modular construction system provides an ideal environment for early childhood education. (1970) \$0.50

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Illustrations of premises and low-budget materials ingeniously converted for early education facilities. Booklet lists general code requirements and information sources. (1972) \$2.00

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THE HIGH SCHOOL AUDITORIUM: SIX DESIGNS FOR RENEWAL

Renovation of little-used auditoriums in old and middle-aged schools to accommodate contemporary educational, dramatic, and music programs. (1967) \$0.75

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Reviews every technique known to EFL for improving the quality of school buildings and equipment: Found space, furniture, community use, reach out schools, etc. Lists hundreds of sources. (1972) \$2.00

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Identifies types of facilities needed to improve environmental education. (1971) Single copies free, multiple copies \$0.25

THE SCHOOL LIBRARY:

FACILITIES FOR INDEPENDENT STUDY IN THE SECONDARY SCHOOL

A report on facilities for independent study, with standards for the size of collections, seating capacity, and the nature of materials to be incorporated. (1963) \$1.25

SCHOOL SCHEDULING BY COMPUTER/THE STORY OF GASP

A report of the computer program developed by MIT to help colleges and high schools construct their complex master schedules. (1964) \$0.75

SCHOOLS FOR EARLY CHILDHOOD

Ten examples of new and remodeled facilities for early childhood education. (1970) \$2.00

SCHOOLS: MORE SPACE/LESS MONEY

Surveys the alternatives for providing school spaces in the most economical manner. Includes extending school year, converting spaces, sharing facilities, open campus, etc. (1971) \$2.00

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Systems Reports

The following reports are available from

BSIC/EFL, 300 Sand Hill Road, Menlo Park, Calif. 94025.

Checks payable to BSIC/EFL. California residents add 5% sales tax.

BSIC Special Report No. 1:

Manufacturer's Compatibility Study. (1971) \$1.00

BSIC Special Report No. 3:

Building Systems Planning Manual. (1971) \$1.00

BSIC Research Report No. 1:

K/M Associates, A Case Study in Systems Building. (1970) \$1.00

BSIC Research Report No. 3:

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Newsletters

BSIC/EFL NEWSLETTER

A periodical recording developments in the systems approach to building educational facilities. Free

COLLEGE NEWSLETTER

A periodical on design questions for colleges and universities. Free

NEW LIFE FOR OLD SCHOOLS

A periodical of case studies about renovating existing school facilities. Free

SCHOOLHOUSE

A periodical on financing, planning, designing, and renovating schools. Free.

Films

These films, resulting from EFL-funded efforts, are available for loan or purchase:

TO BUILD A SCHOOLHOUSE

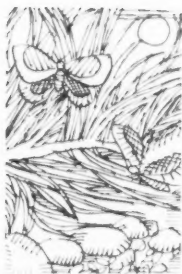
A 28-minute color film outlining trends in school design. Available on loan without charge from EFL in care of Association-Sterling Films, Inc., 866 Third Avenue, New York, N.Y. 10022, and for purchase at \$93.45 from EFL.

ROOM TO LEARN

A 22-minute color film on The Early Learning Center in Stamford, Connecticut, an open-plan early childhood school with facilities and program reflecting some of the best current thinking. Prepared by The Early Learning Center under a grant from EFL and available on loan without charge from Association-Sterling Films, Inc., 866 Third Avenue, New York, N.Y. 10022, and for purchase at \$125.00 from The Early Learning Center Inc., 12 Gary Road, Stamford, Conn. 06903.

A CHILD WENT FORTH

A 28-minute color film on inner-city and ghetto schools and school building problems. Available on loan without charge from Modern Talking Picture Service, Inc., 2323 New Hyde Park Road, New Hyde Park, Long Island, New York 11045 or for purchase at \$75 from The Library, American Institute of Architects, 1785 Massachusetts Avenue, N.W., Washington, D.C. 20036. A 45-minute version is available for purchase from Larry Madison Productions, Inc., 253 East 49 Street, New York, N.Y. 10017.



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